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ABSTRACT

Many colleges and universities, in responding to public demand for higher education and the external challenges it creates, are employing Total Quality Management (TQM) techniques to improve quality, increase productivity, and decrease costs. The quality improvement process itself (the tools for problem identification and developing solutions), largely ignored in the past by academic organizations, is now being studied and applied. The TQM process involves the complete transformation to a quality orientation and requires top-level commitment followed by substantial and comprehensive re-education of all personnel. In addition, the administration must develop a cooperative climate for change and recognize that the faculty play the most important role in developing the concept of continuous quality improvements and other TQM principles as they apply to academic activity. This report examines what quality is and what it requires, the technical system and tools for improving quality, and the type of administrative system required to allow the quality process to be successful. Finally the process of improving academic quality in the curriculum and classroom, as well as its assessment is discussed with emphasis on the student as the beneficiary. An appendix contains the Criteria for the 1992 Malcolm Baldrige National Quality Award. Contains 93 references and an index. (GLR)

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QUALITY

TRANSFORMING POSTSECONDARY EDUCATION

ELLEN EARLE CHAFFEE AND LAWRENCE A. SHERR

REPORT THREE - 1992 ASHE-ERIC HIGHER EDUCATION REPORTS

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Transforming Postsecondary Education

by Ellen Earle Chaffee and Lawrence A. Sherr

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We dedicate this book
to our teachers.

EXECUTIVE SUMMARY

The last decade has brought unprecedented public demand for higher quality in colleges and universities. External agencies and the public have lost confidence in higher education: We might be "for" quality, but in many eyes we do not "do" quality. Moreover, we cost too much.

To deal with these external challenges, a rapidly increasing number of colleges and universities are borrowing an approach from business called Total Quality Management (TQM), Total Quality, the Deming Management Method, Kaizen, Continuous Quality Improvement, or other terms (Cornesky et al. 1990, 1991; Miller 1991; Seymour 1992; Sherr and Teeter 1991).

What Is TQM?

TQM is a comprehensive philosophy of living and working in organizations that emphasizes the relentless pursuit of continuous improvement. It encompasses an extensive array of tools for implementation. Its essence can be simplified to three ideas: defining quality, improving the organization's work performance (or "technical system"), and improving its administrative system.

The fundamental purposes of TQM are to improve quality, increase productivity, and decrease cost. Making the transformation to TQM signifies two basic changes for postsecondary institutions: (1) from asserting that we exemplify quality to a commitment that, no matter how good we are, we can and will continuously improve, and (2) from promising to offer greater quality in exchange for more money to a commitment that we can and will find ways to increase quality *and* decrease cost. These changes, fully implemented, would require substantial cultural change throughout the campus.

What Is Quality?

Quality in design, quality output, and a quality process are all necessary components of quality. Quality in design relates to both the output (for example, an academic program that meets students' needs) and the process (for example, how the curriculum, faculty, equipment, scheduling, and other factors combine to effect the program). Quality output means achieving the desired result; for example, all pharmacy graduates pass their examination for licensure. A quality process means that all the steps within the organization's functioning from beginning to end work effectively toward the desired goals, with each step adding value.

In academic organizations, we have paid considerable attention to quality output (outcomes assessment) and quality in design (curriculum design, transfer of credit). We tend not to think about a quality process. The emphasis on quality output is inadequate because we cannot inspect quality into a product or service at the end of the line. Once a product is made or a service rendered, the only way to improve it is to do it over. On the other hand, if the process is properly designed and functional, quality is built into the result.

Inputs are a favorite proxy for quality in higher education. Inputs are important indeed, but they do not create or measure quality. Design, processes, and outputs define appropriate inputs. Proper inputs maximize the system, while improper inputs limit the system. Therefore, it is more sensible to think of inputs as "proper" or "appropriate" than as part of the definition of "quality."

From the perspective of improving quality, an institution is a collection of processes. Knowing why a process exists is the first step to improving it. Often the purpose of a process was long ago forgotten, and the process has taken on a life of its own. For example, many campuses continue to require the dean's signature on a student's registration card, although often the dean no longer even sees the card, much less provides the advisory or regulatory service that the signature was intended to represent. In addition to having a reason for existence, all processes also exist to meet the needs of the people they are intended to serve. An institution must determine the reason for each process, the people it is intended to serve, and what those people want and need.

What Is the Quality Improvement Process?

The conceptual and operational tools that TQM offers for identifying problems, finding their root causes, and eliminating those causes are often called the "quality improvement process." The improvement of quality is itself a process—the process of applying the scientific method to your work. The literature on TQM often refers to this idea as the Shewhart cycle, the "Plan-Do-Check-Act cycle," or "the PDCA cycle" (Deming 1986, p. 88). First, *plan*. Spend adequate effort to understand the nature and causes of a problem by collecting data on it. Use the data to develop a theory for improving the process: If we do such and such, the process will improve in these ways for these reasons. Then *do*—try your solution in a limited way to be sure it works—and *check:* Did the solution work as intended, or does it need revision? Collect data at this stage too to be sure that the new process is better than the old one. Finally, *act.* When you are satisfied with the results, implement your solution permanently in all areas where it is relevant. Whether the experiment works or not, go through the PDCA cycle again for continuous improvement.

TQM offers a number of analytical tools to use in the PDCA cycle, including flow charts, run charts, Pareto charts, and cause-and-effect diagrams. Process improvement is based on several key ideas:

- You cannot inspect quality into a product or service at the end of the line. Quality requires not just the detection of defects, but also their prevention. It requires elimination of unnecessary steps and assurance of appropriate procedures.
- All work is a process. The details of organizational processes are important because they are the substance of organizational work that ultimately produces the results. If the details are wrong, the process is wrong. If the process is wrong, the results are wrong. Quality requires attention to detail.
- You cannot improve a process without data. And often the data yield surprises.
- Common causes of problems are inherent in every process and are not attributable to the worker.
- Special causes of problems come from exceptions to the normal process. Eliminating them requires detecting them as quickly as possible.
- Adding steps to a process adds opportunities for new problems. Make each process as simple as possible to improve quality.

How Does One Administer for Quality?

Some fundamental points of view characterize the administration of an organization oriented toward TQM:

- The primary job of administration is to remove the barriers that prevent people from achieving quality work processes. Administrators must listen.

- When something goes wrong, the most appropriate and productive first assumption is that the process needs improvement. Making this assumption requires changing the habit of blaming the person who is working in the process.
- The most valuable knowledge about how to improve a process resides in the people who work in the process. Accessing this knowledge requires a supportive climate in which people are free of fear. Taking full advantage of it requires cross-functional teams of people who work at various stages in the process.
- Cooperation must replace competition as the operating premise of the organization. Supporting cooperation will require many substantive changes.
- Administrators must entrust the people who work in a process with the opportunity and the authority to improve it.
- The value of education and training for all cannot be overestimated.
- Systems evaluating personnel and performance must support cooperation, initiative, and continuous improvement. Most do not do so now.

What about Academic Quality?

The faculty will play the most important role in developing the concept of continuous quality improvement and other ideas about TQM as they might apply to academic activity. Faculty must resolve several vitally important questions. To what extent and in what ways are faculty comfortable treating students as beneficiaries? Is it feasible and useful to emphasize the improvement of quality and an orientation toward process in assessment, rather than an orientation toward accountability and outcomes? What would be the implications of relaxing departmental boundaries to encourage more serious examination of the multidisciplinary process of education as students experience it? Can and should faculty incentive systems become more responsive to the faculty's efforts to improve instruction?

How Can a Campus Continuously Improve?

To transform an organization requires individual and collective learning, action (see, for example, Berry 1991; Brassard 1989; Gitlow and Gitlow 1987; GOAL/QPC 1988; Imai 1986; Scholtes et al. 1991; Walton 1986), and leadership (for example, Block 1987; DePree 1989; Shook 1990; Townsend 1990). Such a transformation can be applied specifically to higher education (see Cornesky et al. 1990, 1991; Marchese 1991; Miller 1991; Seymour 1992; Sherr and Teeter 1991; Spanbauer 1987; *Synthesis* 1991).

A complete transformation to quality requires top-level commitment, followed by substantial and comprehensive reeducation of all personnel. The transformation requires time, effort, and willingness to change. It involves up-front investment, but in the long run it reduces cost by increasing productivity. The quality-driven organization meets the needs of the people it serves, both within and without.

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FOREWORD

A number of recent national higher education conferences have focused on the public criticism and discontent against colleges and universities. The reactions of participants are generally defensive, running from "How can they say this about us when our cause is so noble?" to "The public and the press are not competent to know what higher education is all about!" The fact is that the role and importance of higher education in society have changed dramatically over the years, but institutional practices have not. Thus, what was once an acceptable fit between societal needs and institutional performance is becoming increasingly unacceptable to those who financially support the institution.

Before the 1950s, higher education achieved a high level of quality and acceptability through a mutual process of self-selection. Only the brightest students applied to college; institutions accepted only the best applicants. And by grading on the curve, institutions flunked out nearly two-thirds of the students before graduation. The result: Institutions could not help but produce high-quality graduates. An old saying goes, "If hospitals treated patients like colleges treated students, they would never admit any sick people." It was a satisfactory way to maintain high standards as long as society accepted higher education as a luxury, a privilege, and something not terribly important to its economic well-being.

Today, with nearly 50 percent of high school graduates participating in some form of postsecondary education, higher education is no longer seen as a privilege but as a right and an economic necessity. The old practice of controlling quality primarily through selecting only high-quality students (a strategy of controling quality through input) is no longer acceptable. Greater attention now needs to be given to the quality of process, design, and output if higher education is to meet the expectations and needs of those who support it.

For more client-sensitive quality standards to be universally achieved in higher education, several fundamental cultural changes must occur:

- The *value, vision, mission,* and *goals* of the organization must be clearly and specifically defined so all the participants know what the end objectives are.
- The *expectations of those receiving the value of the services* must be taken into consideration when measuring the success of the activity.

- Each *individual, in some way, must accept personal responsibility* for achieving the goals and accomplishing the mission of the organization.
- *Constant evaluation of the system must become routine* to know how successfully the goals are being achieved and the mission is being fulfilled.
- *Training must be available for institutional personnel at all levels,* annually if not more frequently, to ensure sufficent skills to accomplish the institutional mission.

Higher education needs to develop a new sense of the quality issues it is facing and the techniques needed to help it achieve its mission. Ellen Earle Chaffee, vice chancellor for academic affairs for the North Dakota University System, and Lawrence A. Sherr, Chancellors Club teaching professor of business at the University of Kansas, have brought together a vast number of publications that will help academic leaders do so. They stress that it must be understood that the concept of quality is an intensely personal as well as a total organizational belief or philosophy—that the distinctive processes used succeed only when driven by a well-defined vision of quality. Equally important is the realization that the pursuit of quality is a constant and never-ending quest: If an organization stops working to achieve quality, it begins to move away from having quality. This report comprehensively reviews the concepts of total quality and then relates those concepts to how they can be applied to both the academic and administrative areas of the institution.

The implementation of total quality will call for a major transformation of organizational values, norms, structures, and processes. This transformation does not mean that the essential values of academic freedom, intellectual creativity, and the pursuit of new wisdom must be sacrificed. Old habits based on outdated needs will have to be discarded. But the characteristics that have made U.S. higher education a world standard will be further guaranteed only when they become part of the articulated value and mission of an institution seeking the highest possible quality standards for its students, faculty, and society.

Jonathan D. Fife, Series Editor
Professor of Higher Education Administration and
Director, ERIC Clearinghouse on Higher Education

GETTING TO TOTAL QUALITY

From listening comes wisdom.

—Proverb

We might be "for" quality, but in many eyes we do not "do" quality.

Every U.S. college or university is for quality. Every accreditation self-study documents quality. Every set of admission requirements promotes it. Every faculty member grades for it. Every promotion and tenure committee screens by it. Everyone is for quality.

Yet the last decade has brought unprecedented public demand for higher quality in colleges and universities. National reports led quickly to regional accrediting bodies' requiring assessment of outcomes, which itself has become a major, costly industry within our enterprise. National higher education associations are watching closely the new initiatives for testing from the U.S. Department of Education and the presidential goals for education in 2000. External agencies and the public have lost confidence: We might be "for" quality, but in many eyes we do not "do" quality.

Moreover, we cost too much. Faculty attention seems to continue to shift away from teaching and toward research. Tuition and state costs rose too far and too fast in the 1980s. Neither family incomes nor tax receipts could continue the pace. Among the headlines of the 1990–91 academic year:

- Undergraduates at large universities found to be increasingly dissatisfied (Wilson 1991);
- A new barbarism—dogmatic, intolerant, and repressive—has descended on America's institutions of higher learning. We who pay the bills ignore the outrages and subsidize those who would do us in (D'Souza 1991);
- Anyone paying attention knows that the last few years, and particularly the past six months or so, have not been kind to higher education (Atwell 1991);
- Poorer preparation for college found in 25-year study of freshmen (Dodge 1991a);
- Clouded economy prompts colleges to weigh changes (Grassmuck 1990);
- In an era of tight budgets and public criticism, colleges must rethink their goals and priorities (Likins 1990);
- Throughout the 80s, colleges hired more nonteaching staff than other employees (Grassmuck 1991);
- Public colleges expect financial hardship . . . as budget crises imperil state appropriations (Blumenstyk and Cage 1991);

- Colleges facing severe financial problems (*Higher Education and National Affairs* 1991).

To deal with these external challenges, a rapidly increasing number of colleges and universities are borrowing an approach that some American businesses have begun to use in the last decade—Total Quality Management (TQM), also known as Total Quality, the Deming Management Method, Kaizen, Continuous Quality Improvement, or other terms (Cornesky et al. 1990, 1991; Miller 1991; Seymour 1992; Sherr and Teeter 1991).

We have borrowed from business before, never with enthusiasm and always as a last-ditch measure to silence our critics or deal with hostile forces. TQM is different from past borrowings, however. The demand for financial accountability in the 1960s ushered in standard accounting measures and practices, with leadership from the National Center for Higher Education Management Systems. Pressures to maintain enrollments in the 1970s brought the concepts of competition and marketing—previously considered uncouth at best—to the ivory tower. By the early 1980s, the continuing struggle to maintain both enrollments and finances led us to strategic planning, our first sustained initiatives to think seriously about our environment, the services we render, and the need to anticipate the future.

In every case, we have modified the business tool to fit our needs. Many times, only a few campuses have explicitly adopted the tool, while others have incorporated selected pieces of it into their operations. Accounting practices, marketing, and strategic planning have fulfilled few of the gloomy predictions of their early opponents. They directly involve relatively few of our personnel, yet virtually everyone in postsecondary education recognizes these changes and can see their impact on the enterprise.

Total Quality Management is both like and unlike these earlier tools. Like them, it comes from business, it requires modification to suit a collegiate organization, and, if applied as intended, it cannot harm our enterprise. Unlike them, it requires explicit commitment, it requires organizational transformation by adoption in its entirety, it must involve all personnel, and it will change the organizational culture. TQM is not a management tool. It is a comprehensive way of living in organizations.

On the one hand, then, TQM is the latest version of a familiar scenario that has generally brought positive results: Higher education adopts business practice to a limited extent and finds some value in doing that. On the other hand, its nature and scope foretell fundamental, pervasive changes on an unprecedented scale. But taking the risk that such change entails involves some potential gains:

- Continuously improved quality of services and products;
- More satisfied students, faculty, staff, and external supporters;
- Greater productivity, with more payoff per hour of effort;
- More and better services for the same or less money;
- New ways to cope with economic difficulties;
- Slower increases in tuition and state funding.

This report reviews the key points of TQM from the perspective of postsecondary education to help the reader form a personal opinion about the wisdom of embarking on the Total Quality journey and take the first steps. The authors admit unabashedly to a bias in favor of TQM.

What Is TQM?

TQM is a comprehensive philosophy of living and working in organizations, emphasizing the relentless pursuit of continuous improvement. It encompasses an extensive array of tools. Its essence can be simplified to three ideas: defining quality in terms of the needs of the people and groups that the organization serves (see the second section), improving an organization's work performance or "technical system" (process analysis and improvement, discussed in the third section), and improving the administrative system (personnel and organizational issues, discussed in the fourth section). Most authors, however, have longer lists of key ideas, and some, such as Philip Crosby, provide numerous lists and steps. Cornesky et al. (1991) review key TQM authors Deming, Juran, Crosby, and Imai. The most-cited set of principles is Deming's Fourteen Points (see table 1). Although we advocate colleges' and universities' reviewing all the major literature on TQM and using or adapting the portions they find most helpful, we believe that Deming's approach is especially well-suited to postsecondary settings. The language of his Fourteen Points is appropriate for nearly any kind of organization, and

TABLE 1

W. EDWARDS DEMING'S MANAGEMENT OBLIGATIONS

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.
2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.
5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.
6. Institute training on the job.
7. Institute leadership. The aim of leadership should be to help people and machines and gadgets to do a better job. Supervision of management . . . [needs] . . . overhaul, as well as supervision of production workers.
8. Drive out fear, so everyone may work effectively for the company.
9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and [problems] in use that may be encountered with the product or service.
10. Eliminate slogans, exhortations, and targets for the work force, asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.
11. Eliminate work standards (quotas) on the factory floor. Substitute leadership. Eliminate management by objectives. Eliminate management by numbers, numerical goals. Substitute leadership.
12. Remove barriers that rob the hourly worker of his right to pride of workmanship. This means, inter alia, abolishment of the annual or merit rating and of management by objective.
13. Institute a vigorous program of education and self-improvement.
14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job.

Source: Deming 1986, pp. 23–24.

the philosophical basis of his work is generally compatible with the activities and values of educators.

A deep understanding of Deming's points would provide everything one needs to know to create a continuously improving organization. We recommend reading more about the points (see the final section and the list of references) and using them as a frequent touchstone while making the transformation to quality. The points are not steps for implementation. They underscore the fact that, more than anything else, TQM is a philosophy about quality, methods, and people. It is said that someone attending one of Deming's seminars said to Dr. Deming, "This is wonderful! But could you tell me please, what should I do when I go home? How can I implement it?" Dr. Deming looked at him, paused, and said, "Implement *what?*" Dr. Deming advocates transformation of the entire organization, not implementation as if TQM were a method, a project, or a program. No matter which author(s) one might choose to follow, organizational leaders must be committed and stick close to the underlying philosophy.

The goal of TQM is to establish an organizational culture that prizes quality, relentlessly improving in search of perfection. This goal contrasts sharply with the common parlance:

- "Nobody's perfect."
- "If it ain't broke, don't fix it."
- "Experience is the best teacher."
- "Good enough for government work."

Instead, leaders in TQM are likely to substitute statements like the following:

- "Until we're perfect, we will continuously improve—which means forever."
- "If it's not broken, make it better."
- "Experience is the teacher of last resort. We have better methods."
- "In all work, we must strive constantly for the highest quality."

The fundamental purposes of TQM are to improve quality, increase productivity, and decrease cost. Becoming a continuously improving organization signifies two basic changes for postsecondary institutions: (1) from asserting that we exemplify quality to a commitment that, no matter how good we are, we can and will continuously improve; and (2) from promising to offer greater quality in exchange for more money to a commitment that, no matter how effective and efficient we are, we can and will find ways to increase quality *and* decrease cost. These shifts would require substantial cultural change that pervades the campus, representing a change in our understanding of how and why we do what we do.

Where Did TQM Come From?

Total Quality Management arose initially through work at Bell Laboratories and the U.S. Bureau of the Census in the 1930s. The emphasis then was on the technical side (see the third section), and its impact was limited to settings that gained direct benefit from statistical process control (SPC), such as precision manufacturing. U.S. munitions, weapons, and other war materiel manufacturers in World War II used SPC to great advantage, with government-sponsored SPC training programs for an estimated 7,000 to 10,000 engineers throughout the country provided by noted statisticians under the auspices of Stanford University. One such statistician reported that an expert observer believed that "the favorable results from this program in the aircraft industry in southern California were sufficient to pay the entire cost of the . . . program" (Eugene L. Grant, cited in Lang 1991, p. 35).

After World War II, U.S. government officials who were responsible for helping Japan rebuild its economy brought TQM to Japan. W. Edwards Deming, born in 1900 and still teaching statistics for New York University, and Joseph M. Juran were instrumental in this effort. Japan's highest national quality award is named for Dr. Deming (for fuller discussions of early developments in the United States and Japan, see Aguayo 1990, Juran 1991, or Walton 1986).

By the early 1950s, TQM had expanded to include administrative concepts (discussed in the fourth section). Many Japanese industries embraced TQM fully and have developed its concepts and applications over the past 40 years. The Japanese are now building on TQM toward advanced principles by, for example, using cross-functional teams to simultaneously pursue three new products to replace each present product, with the same investment of time and money—systematic abandonment, through improvement, of their own products and services (Drucker 1991).

Some in the United States have questioned whether cultural differences between the countries would undermine TQM's effectiveness here, but this concern has proven unfounded. The turning point for TQM in the United States was a 1980 NBC documentary featuring Dr. Deming called "If Japan Can, Why Can't We?" The broadcast galvanized Donald Petersen of Ford Motor Company, and the national leaders have expanded to include American Express, IBM, Xerox, Motorola, Procter & Gamble, Corning, Hewlett-Packard, and many more. The U.S. Department of Defense is promoting Total Quality among its suppliers. As of 1992, members of the European Community will give preference to firms practicing TQM.

In 1987, the U.S. Congress created the Malcolm Baldrige National Quality Award, named for a former Secretary of Commerce and similar to Japan's Deming Prize. Given annually in October after extensive on-site company evaluations, the award has gone to Motorola, Cadillac, Federal Express, Xerox, and a few other firms. Appendix A presents the 1992 criteria for the Baldrige Award, which many recommend using as guidance for the transformation to quality in any enterprise.

Does TQM Apply to Higher Education?

Total Quality Management began in manufacturing firms and has only in the last decade taken hold in service firms. The shift from manufacturing to service required redefining some elements of TQM and emphasizing some parts of it over others. The experience of service firms that have used TQM confirms that it is valuable for them (see, for example, Berry 1991 and Townsend 1990). Compared to manufacturers, service environments are more like education organizations, and their stories are more instructive for us. Nevertheless, additional translation and modification of TQM are required to make it workable for higher education. But why do we believe TQM can work for higher education?

First, TQM is a comprehensive philosophy, with principles and tools. Unlike many administrative innovations, TQM is not a recipe of ingredients and steps that must be followed slavishly to produce the intended result. Rather, TQM is more like a well-equipped, well-stocked kitchen. TQM has the ingredients and the mechanisms of good management, from which organizations select those that suit their needs and purposes. A community college in Maine is free to make seafood dinners, while a university in Kansas fixes beef.

This first observation is the source of a persistent difficulty among people who are just beginning to learn about TQM. Such people often express frustration about what they perceive to be its vagueness or incompleteness, for example by asking for a single, precise definition of quality or a list of customers. TQM provides very few answers; rather, it poses key questions and provides an array of potential methods through which *the organization's participants* can answer them. Participants themselves must shoulder the responsibility of creating a continuously improving organization, and an essential element of the transformation is that they apply their own expertise—whether defined by their prior training, their personal knowledge of the organization, or their insights about the work of their unit within the organization—toward continuous improvement. They study TQM to understand the philosophy and tools, but the work remains theirs to do. An analogy to studying art history, theory, and technique might be apt in that the aspiring artist finds such study to be an essential but not sufficient method of producing a prized sculpture. Making the transformation to quality is hard work, and the payoff is an organization that is uniquely suited to meet the needs of its participants and patrons.

The second reason for believing TQM will work in higher education is its face validity: It just looks right. People, including higher education administrators, who learn about TQM often say, "Why, that's nothing but good management!" And they are at least partially correct. TQM uses many known principles and tools of good management. Perhaps its major contribution to practice is that it makes good management clear and understandable. It contains all the essential elements in one consistent package. It rejects some ingredients that have proven ineffective but remain common in practice, and it adds some ingredients that organizations have typically overlooked.

This way of describing TQM could mean one of two things: Either we are already practicing TQM (because we are good administrators), or we are not good administrators (because we are not practicing TQM). In most organizations, both statements are true. Many of the activities we are most proud of represent our use of the principles and methods of Total Quality Management, even though we did not call them TQM. Sometimes, however, administrative behavior matches what we know about good administration, and other times it does not. When it does not, it is often because we are focusing on meeting a deadline, struggling against constraints on resources, or dealing with other pressures. These factors tend, over time, to build bad habits into personal and organizational work processes—habits that become so normal that we lose our capacity to see them. Focusing on continuous improvement permits organizations to see and change such habits.

The third indication that TQM will work in higher education is that it is already working in a number of similar enterprises and a few colleges and universities. Starting in 1992, U.S. hospitals, similar to universities in many ways, must use "continuous quality improvement" to be accredited (Joint Commission 1990). Management consulting firms are beginning to focus on quality improvement. The American Association of School Administrators is promoting TQM for schools (*School Administrator* 1991), and two postsecondary accrediting bodies (the American Association of Collegiate Schools of Business and the Accrediting Board for Engineering and Technology) support it. Universities and colleges in various stages of using TQM include Fox Valley Technical College, Delaware County Community College, Hutchinson Technical College, Oregon State University, the University of Michigan, St. John Fisher College, the University of Wisconsin, Pennsylvania State University, the University of Pennsylvania, Colorado State University, the University of Wyoming, and all 11 campuses in the North Dakota university system. The first campus in the nation to use TQM began in about 1985, and it began to spread rapidly in academic year 1989-90. Many campuses began using TQM on the administrative side, leaving academic issues for later. In some cases, only one office or division within a campus has begun using TQM.

The following stories of early initiatives in colleges and universities focus on two important elements of TQM: the targeted quality improvement project and the quality mission statement. These vignettes do not begin to suggest the rich possibilities of full-scale commitment to continuous improvement, but they provide a sense of what TQM is beginning to do in higher education.

Pilot quality improvement projects at Oregon State

Oregon State University began using TQM in administrative areas in 1989 (Coate 1990b). During the first year, teams tried 10 pilot projects to improve their processes and to evaluate the potential value of TQM for the university. The university required that solutions add no new costs or personnel.

The improvement projects were in physical plant, printing and mailing, budget information, computing services, business affairs, public safety, radiation center, and staff benefits services. Here are some of the improvements:

- Average duration of remodeling jobs reduced by 23 percent;
- Preprinting process time expected to be reduced by 50 percent;
- "Budget-status-at-a-glance" form improved to meet customers' needs and cut preparation time by 50 percent;
- Number of journal vouchers returned to departments to correct errors decreased by 94 percent;
- Time to process grant/contract documents decreased by 10 percent;
- Number of daily building security checks increased by 17 percent;
- Number of phone calls getting initial human response increased by 40 percent.

Teams collected a great deal of data before, during, and after implementing their solutions, such as average duration of remodeling jobs, month by month; total number of lost days in the preprinting process, by cause; error rate in journal vouchers, by cause; and number of days required to set up a grant or contract account, by weekly average.

Team members had some comments about TQM:

- "People see that there are ways to change things and that they do have a voice in the process. We have changed attitudes."
- "One benefit I am seeing is management's cooperation in listening to employees. There is more communication. And there's a growth in teamwork. People are starting to think, 'When I do something, who else down the line will be affected?' That's a positive thing."

- "TQM will be great if they let the people below management level come up with the problems and use the process where it can be most productive."
- "TQM encourages people to think and work collectively in the interest of goals beyond individual performance. It enhances the organization's efficiency."
- "TQM works best if you take problems in little chunks. As soon as we narrowed the issue to the journal voucher process, we started to move."
- "We thought we knew what our problems were. TQM helped us find out what they *really* were. TQM has given us a process to use in the future."

"We thought we knew what our problems were. TQM helped us find out what they really were."

The university's evaluation of all the projects and teams found that nearly two-thirds of the team members and nearly three-fourths of the team leaders had an overall positive opinion of TQM. Despite strong signals of upper management's interest in TQM, such as commissioning the pilot teams, more than half the team participants believed they had not seen visible support from the top. A major concern of participants was the difficulty of finding time for their project work while also maintaining their normal workload. The bottom line? Seventy-one percent agreed that teams should be formed at all levels of finance and administration to improve processes (Coate 1990a).

Improving a class at the University of Wisconsin

Ian Hau teaches a required undergraduate class in business statistics at the University of Wisconsin. He and six students in the class formed a quality team to continually reduce and eliminate defects in the teaching process. During one term, the percentage of students having problems in computer instruction dropped from 78 percent to 22 percent, the percentage of students' problems with blackboard presentations dropped from 56 percent to 8 percent, and the percentage of problems in overhead presentations dropped from 82 percent to 46 percent.

Hau defines the students as customers of the delivery of course material, seeing them in other roles with respect to the course content and evaluation of students' performance. Hence, the quality team focused on delivery of course materials and defined students as the customers of this process.

Figure 1 shows their cause-and-effect diagram of the factors that contribute to quality instruction. It shows the issue under consideration, creating a quality class, on the right side. Through data collection and brainstorming, Hau and his class members identified the remaining items on the diagram as potential contributors to ensure a quality class. They organized the items into six groups of related items: computer, book, lecture, homework, discussion, and students. The resulting diagram provided the class with a road map for the elements that might need improvement. The team used these factors as the basis for a survey of students' satisfaction administered three times during the semester.

Among Hau's changes to improve students' satisfaction were switching to thicker chalk for the blackboard, repositioning the overhead projector, restructuring the computer homework assignments, adding a review session before examinations, and allowing more time for examinations. The quality team also left data and recommendations for continuing the improvement process in the following semester.

Hau concludes, "All changes were small, [but] data showed that the impact was large. None of [them are] difficult to understand. None of [them are] easy to do. It takes courage. The courage to identify defects. The courage to improve" (Hau 1991).

Quality improvement projects at Delaware County Community College

In 1991, Frank Topper and John Bandfield of the University of Pennsylvania visited with Susanna Staas of Delaware County Community College (DCCC), which had been using TQM for about five years (DeCosmo, Parker, and Heverly 1991). They noted that:

- The first improvement project, intended to involve the president and all vice presidents, proved too big to handle. They backed off and chose a more manageable project in admissions and registration. For example, people calling admissions were often put on hold to the point that 16 percent hung up before speaking with anyone. Procedural changes reduced the problem to zero.
- Early teams had senior administrators as "mentors," charged with asking encouraging questions, helping find

data, and advising. The mentors found it difficult to sit back and support rather than control; team members found it hard to speak their minds freely. The brainstorming process, coupled with mentors' restraining themselves from taking over, helped overcome these problems.

- All teams took longer than expected, ranging from nine to 18 months. Collecting data through cycles (e.g., an academic term) contributed to lengthening the process.
- Managers had difficulty "keeping their TQM hat on" when they went from team meetings back to their offices, which created serious problems in credibility.
- Providing training when teams needed it to deal with their improvement projects was more effective than heavy investment in training before projects.
- Teams found that measuring time was more useful than measuring dollars.
- Other improvement projects have dealt with copy machines (time saved by secretaries alone paid for the solution) and staff parking (better match of lot space with users created adequate staff space and even freed up "extra" space for an additional student lot).
- Local companies are "knocking down the door" with requests for training in TQM from DCCC.
- Constant reminders about making data-based decisions are needed because the tendency to jump ahead with an innovative idea is strong.[1]

Colorado State University

Mollie Smilie, controller at Colorado State University, began using TQM in about 1989 in the accounting services offices—accounts receivable, accounts payable, payroll, and similar functions. As it evolved, others in the university noticed a marked shift in the staff's attitudes, from "hoard the funds" to "serve the customer," and they were delighted. The experience demonstrates that TQM can begin in an office, not necessarily campuswide, and that its success frequently prompts other offices to begin using TQM. Smilie also believes that TQM can work especially well in higher education organizations because well-educated personnel catch on quickly.[2]

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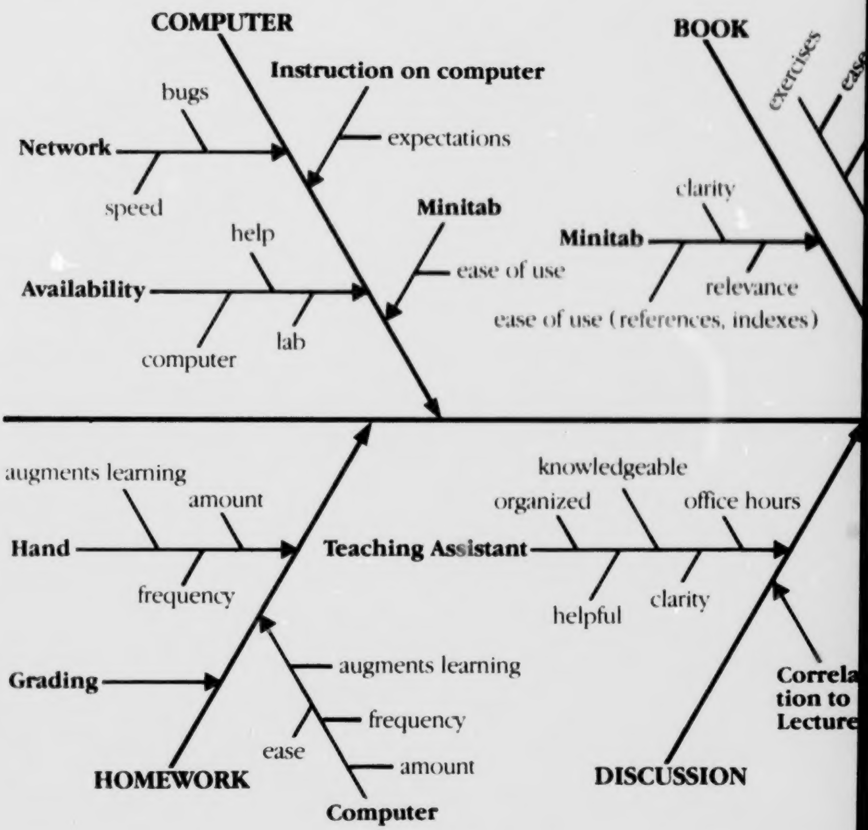
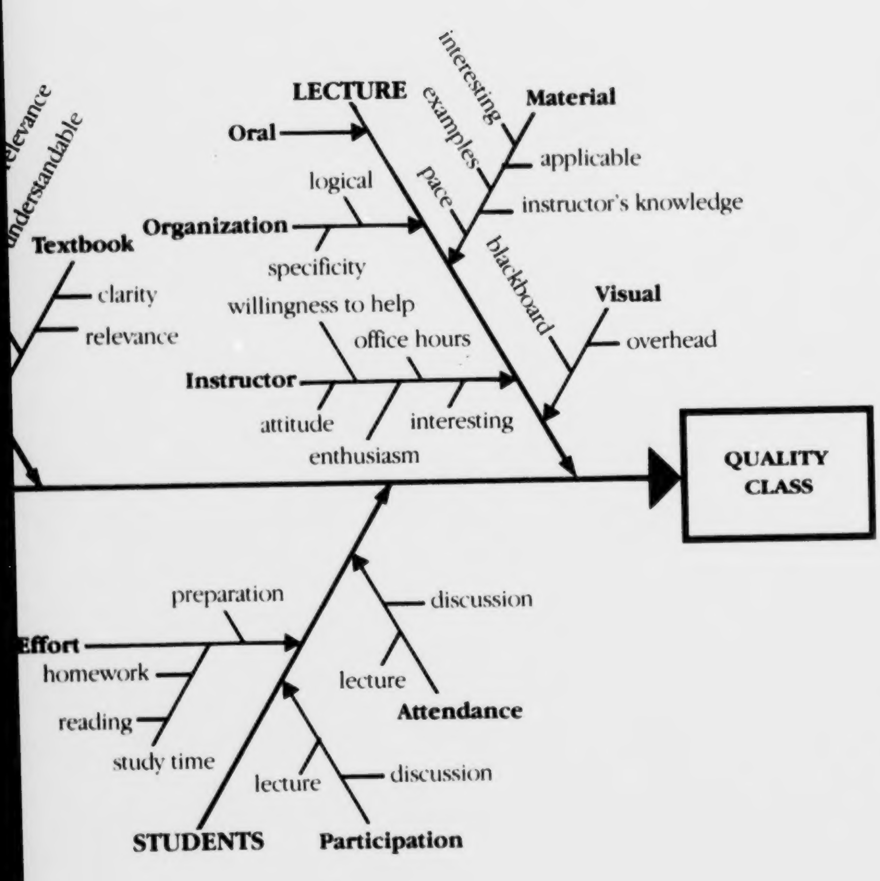
1. Frank Topper and John Bandfield 1991, personal communication.
2. Mollie Smilie 1991, personal communication.

FIGURE 1

CAUSE-AND-EFFECT DIAGRAM FOR A QUALITY CLASS


COMPUTER
Instruction on computer
bugs
Network
expectations
speed
Minitab
help
ease of use
Availability
lab
computer
BOOK
exercises
eas
clarity
Minitab
relevance
ease of use (references, indexes)
augments learning
amount
Hand
frequency
Grading
augments learning
frequency
ease
amount
HOMEWORK
Computer
knowledgeable
organized
office hours
Teaching Assistant
helpful
clarity
Correla
tion to
Lecture
DISCUSSION

Source: Hau 1991.


interesting
LECTURE
Material
examples
Oral
applicable
relevance
understandable
logical
pace
instructor's knowledge
Organization
Textbook
specificity
blackboard
clarity
willingness to help
Visual
relevance
office hours
overhead
Instructor
attitude
interesting
enthusiasm
QUALITY CLASS
preparation
discussion
Effort
homework
lecture
Attendance
reading
study time
discussion
lecture
STUDENTS
Participation

A quality improvement project: "We can't find stuff"

The chancellor's office in the North Dakota university system maintains a great deal of correspondence and reports, much of which is needed urgently and unexpectedly during the legislative session. Staff members realized in summer 1990 that they did not have confidence in their ability to locate materials on demand. A team of two secretaries and two vice chancellors tackled the matter, with frequent officewide consultation. The team was cross-functional because both secretaries and vice chancellors create, store, and retrieve documents, but each role brings a different perspective on the process. Cross-functional teams are common in TQM because they can help ensure that a solution will work for all affected parties.

The team stepped through a problem-solving process called the Plan-Do-Check-Act cycle (see the third section). Team members determined that the office had over a dozen different filing systems—a stunning fact that was obvious only with the benefit of hindsight. They created a classification system for all documents, reorganized all existing files accordingly, and established a tracking and records management system. In the process, they created enough space in existing file cabinets to cancel an impending order for more cabinets. They cleaned and reorganized the storage vault. They went through 79 boxes in off-site storage and, through archiving and destroying materials, reduced off-site storage by half.

Team members achieved more than a reduction of stored materials and the need for new cabinet space, however. They estimate that time no longer needed to hunt for materials could equal as much as half a full-time employee per year, time now available for productive work. The improvement process required less than the equivalent of one-fourth time for one person that year, so the payback period for that investment passed quickly. Over three years, the estimated savings totaled $70,000. Soon after the project was completed, a board member needed a document at once that existed only in the computer of the absent staffer who generated it. Another staff member, however, was able to find it in less than a minute. The project brought improved morale, substantial savings in time, and, most important, dramatic improvements in customer service.

—O—

Although each of these examples shows a significant improvement in the particular process being studied, we must admit that the improvements had a minor impact on the entire institution. Colleges and universities committed to continuous improvement will in time have hundreds of such improvements in place, and the sum of the incremental improvements coming from these efforts can result in significant institutional change over several years. To date, no institution of higher education has been using this philosophy of continuous improvement long enough to show the total effects, but businesses have substantially improved employee relations, productivity, customer satisfaction, market share, and profitability (U.S. General Accounting Office 1991).

The following section, "Total Quality: A Verb, not a Noun," explains how TQM defines quality, the cultural changes this definition entails, and how they apply to colleges and universities. The third section, "How Can We Improve Quality? The Technical System," emphasizes the importance of process thinking and introduces some of the technical tools of TQM, and the fourth section, "How Can We Improve Quality? The Administrative System," addresses the administrative, leadership, and human relations components. The fifth section, "Improving Academic Quality," presents some preliminary ideas about how academic activities can use TQM—preliminary because faculty members are just beginning to translate philosophies of continuous improvement for their work. The final section, "Getting Started," discusses ways to get started using TQM and how to address some common issues encountered in the transformation.

TOTAL QUALITY: A Verb, not a Noun

> *Everyone doing his best is not the answer. It is first necessary that people know what to do. Drastic changes are required* (Deming 1986, p. x).

Total Quality Management is a comprehensive way of life for an organization, which becomes driven by a commitment to continuously improve service to others. This commitment is so central that quality-driven business organizations claim to place the pursuit of quality ahead of short-term profit. The drive toward perfection is the essence of "quality" in TQM. In effect, quality is not a state of being (a noun) but something people do (a verb).

This orientation toward action means that TQM definitions of quality often focus on what people must do to pursue quality. Because TQM is so all-encompassing, various authors have different ways of summarizing these actions. Different organizations relate well to different approaches to TQM, and leaders are well-advised to search among these approaches until they find one, or construct their own synthesis, that is appropriate for their campus.

What *Is* Quality?

Definitions of quality in the literature on TQM are diverse and often appear vague, partly because of the action orientation of quality in TQM. It is also a sign of the importance TQM authors attach to each organization's developing its own definitions of quality after coming to understand the TQM point of view. TQM is, for example:

- Aimed at the needs of the consumer, present and future (Deming 1986, p. 5);
- Continuing improvement involving everyone (Imai 1986, p. xx);
- A thought revolution in management (Ishikawa 1985, p. 3);
- Fitness for use (Juran 1989, p. 15);
- Conformance to requirements (Crosby 1979, p. 15).

Definitions of quality related to TQM tend to share several common characteristics. First, they focus on meeting or exceeding the needs and expectations of the customer or the beneficiary of the organization's work. Second, they see quality as perfection: One can never achieve it, but constantly seeking to achieve it and getting closer to it are critically important. Third, they stress that quality can be pursued only when everyone in the organization is involved in the effort. Finally, they recognize that achieving a quality outcome requires quality at every step of the process.

One of the implications of these definitions is that quality differs from one setting to another. Quality in the admissions office is different from quality in the classroom. Quality in the classroom of one institution could be different from that of another institution. Therefore, one of the ongoing and central activities of TQM is, in effect, to define quality as it pertains to the task at hand. One does not make the transformation to quality by engaging in a massive dialogue to seek consensus on a single definition of quality for the organization. Rather, one develops a common understanding of the organization's mission to achieve quality in general by understanding thoroughly who its customers are and what they need. Once the mission to achieve quality is in place, work groups use various standards of quality to ensure that the organization achieves the mission. (The mission to achieve quality is discussed in more detail in the fourth section. The centrality of customers' needs in definitions of quality merits fuller attention here.)

In higher education, some might think that "customer" is an overly commercial term, as we once considered "competition" and "marketing" to be. To avoid unnecessary debate about the appropriateness of the word "customer," we use "beneficiary" to signify the person, persons, group, or groups who benefit from our services. Some advocates of quality in postsecondary education strongly believe that retaining and becoming comfortable with the term "customer" are important parts of the transformation to quality. We understand that point of view and encourage retention of "the C word" wherever its use is not so disturbing as to undermine the effort at transformation.

Whatever the terminology, this aspect of quality focuses attention on the essential mission of the enterprise: to serve the needs of other people. Postsecondary institutions have no legitimate claim on resources unless they serve the learning needs of society through teaching, research, and service. The beneficiaries—students, families, taxpayers, donors—pay for services, and they expect quite reasonably that those services will meet their needs for productive employment, satisfying lives, and a better world.

Too many business organizations, as well as colleges and universities, forget three very simple, but important, principles:

1. The most important part of any organization is the people it serves.
2. To attract new beneficiaries and hold old ones, you have to satisfy their needs.
3. You can't satisfy their needs unless you know what their needs are (Sherr 1990, p. 40).

Quality is providing both internal and external beneficiaries with what they need. . .

Campus people who forget these points include the occasional faculty members who teach what interests them rather than what students need to know, who teach without regard for students' different learning styles, or who fail to help students understand the goals of the class and why they are important. They include registrars who think their job is to enforce rules or business officers who think only of hoarding funds.

The first step in redressing these problems is to identify the beneficiaries: Who are the people who receive (and presumably benefit from) one's work? Many are internal beneficiaries, such as the student in the classroom, the secretary who processes papers from an "out" basket, or the office down the hall that receives an administrator's expense voucher. Others are external customers. On the campus level, external beneficiaries include taxpayers, parents, alumni, donors, and grant agencies. A person could be a beneficiary at some times and a service provider at others. The traveler is a service provider in completing a reimbursement form but a beneficiary when the correct check arrives on time. Quality is providing both internal and external beneficiaries with what they need, whether that be an effective learning experience, clear directions for action, or a complete and accurate form.

The second step is to find out what the beneficiaries need. A good way, which is surprisingly rare, is to ask them what they need and whether they believe they are getting it (asking whether they are getting what we want them to get is not the same thing). Their need could be as simple as clarity, accuracy, or completeness. It could be as complex as defining what students will need to know later in their lives. Students are a very special class of beneficiaries (see the fifth section).

Who are your beneficiaries? What do they need? How do you know? Are you meeting their needs? How do you know? These questions are central to all organizations, and the answers differ for each one. Answering the questions focuses the organization on serving its beneficiaries and on gathering data to ensure continuous improvement in services.

What Does Quality Require?

We define three different kinds of quality—design, output, and process—all of which are necessary components of quality. Quality in design relates to both the output (for example, an academic program that meets students' needs) and the process (for example, the curriculum, instructional approaches, faculty, equipment, scheduling, and other factors that make up the program). Quality output means achieving the desired result. If all pharmacy graduates pass their licensure examination, the program could be said to have quality output. Process quality means that all the steps within the organization's functioning from beginning to end work effectively toward the desired goals. For example, students in a series of useful, synergistic, nonredundant courses that make them effective engineers are experiencing a quality process.

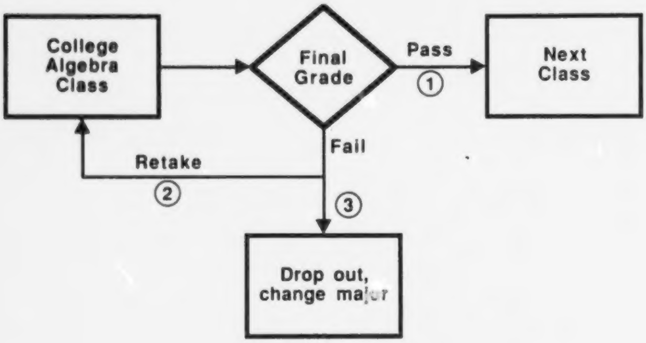
In academic organizations, we have paid considerable attention to quality output, for example, in assessments of outcomes. We work on quality of design in issues like curriculum design and transfer of credit. We tend not to think about process quality, yet it is one of the most significant contributions of TQM. Other kinds of quality are also important in TQM, but process quality is central and is not often considered in other discussions of quality.

An old adage in TQM emphasizes the importance of process quality: "You can't inspect quality into a product or service at the end of the line." Once a product is made or a service rendered, the only way to improve it is to do it over again. In business, doing it over again when the item is salvageable is called rework; when it is not salvageable, the item is called scrap. In either case, it costs money. If the process is properly designed and functional, reducing rework and scrap brings substantial savings and increased productivity. These concepts have analogies in postsecondary education.

Figure 2 shows a simplified flow chart of a college algebra class. Path 1 is the desired process: Students take the class and pass. Path 2 represents rework in the process, when stu-

FIGURE 2

FLOW CHART OF ALGEBRA PROCESS



dents fail and retake the class. Path 3 represents scrap: Students fail the class and change their curriculum or even their life plans. The words "rework" and "scrap" apply here to properties of the algebra process, not to students. We assume that path 1 is the aim of every course and that institutions and faculty seek to minimize the flow in paths 2 and 3 through placement examinations, effective instruction, and other means. The volume of activity along paths 2 and 3 is high for a poor-quality process, low or nonexistent for a high-quality process.

Unfortunately, both the institution and the student must pay for a low-quality process. The institution pays in remedial services and in classroom seats taken by students enrolling again. In some cases, these seats could add up to an entire section that would not otherwise have been needed. The student pays in delayed progress toward the degree and in tuition, perhaps also forgoing an elective course. In some cases, the student must alter his or her life plans, dropping out of school or changing majors. All these costs are absent from a high-quality process.[3]

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[3] See Taguchi 1986 for a discussion of the notion of a societal cost in addition to costs incurred by the organization and the beneficiary. His work on loss functions is technical, appropriate for more advanced study.

Another important feature of process quality is simplicity. A high-quality process includes only those steps that are required to produce the desired output. Unnecessary complexity in a process carries costs in terms of wasted effort and, as the following section explains in more detail, errors that give rise to rework and scrap. Figure 3 shows the actual steps in a real university from the time a traveler submits a request for reimbursement to when he or she receives a check. The process requires 24 steps and 14 signatures. Simplifying this process could lead to substantial savings in time and effort, which could be reallocated to more productive activities. This process is not unusually complex, in our experience, but most campuses are entirely unaware of how complicated their processes have become over time, how little most participants understand those processes, or how unaware people are of how their work fits into larger processes.

Where Do Inputs Fit In?

Postsecondary education has also paid a great deal of attention to inputs in its discussions of quality. During the decades before outcomes assessments became popular in the 1980s, inputs were a central concern of administrators, faculty, and accrediting agencies. For example, we examined—and still do—the number of volumes in the library, the size of the endowment, the number of doctorates on the faculty, and the test scores of admitted students. We believed that these inputs were essential to an effective educational institution. From the point of view of TQM, inputs are very important, but they do not define quality.

This section began with an emphasis on quality as a condition that is properly defined in terms of the beneficiary's needs. Those needs drive the entire organization and define the output. The output is directly a function of the processes used to create it and the design elements that specify both process and output, as shown in figure 4.

The two-way arrows in figure 4 represent the process of continuous improvement. The organization stays in touch with changing needs and adjusts its output and processes accordingly. By using the procedures and tools for improving quality described in the next section, the organization also continuously improves the capacity of its design and processes to yield the output effectively and efficiently.

The inputs do not create quality design, processes, or outputs; rather, they are derived from them. Design, processes, and outputs, based on the needs of beneficiaries, define appropriate inputs. Proper inputs maximize the system, while improper inputs create limitations on the system. Therefore, it is more sensible to think of inputs as "proper" or "appropriate" than in terms of "quality."

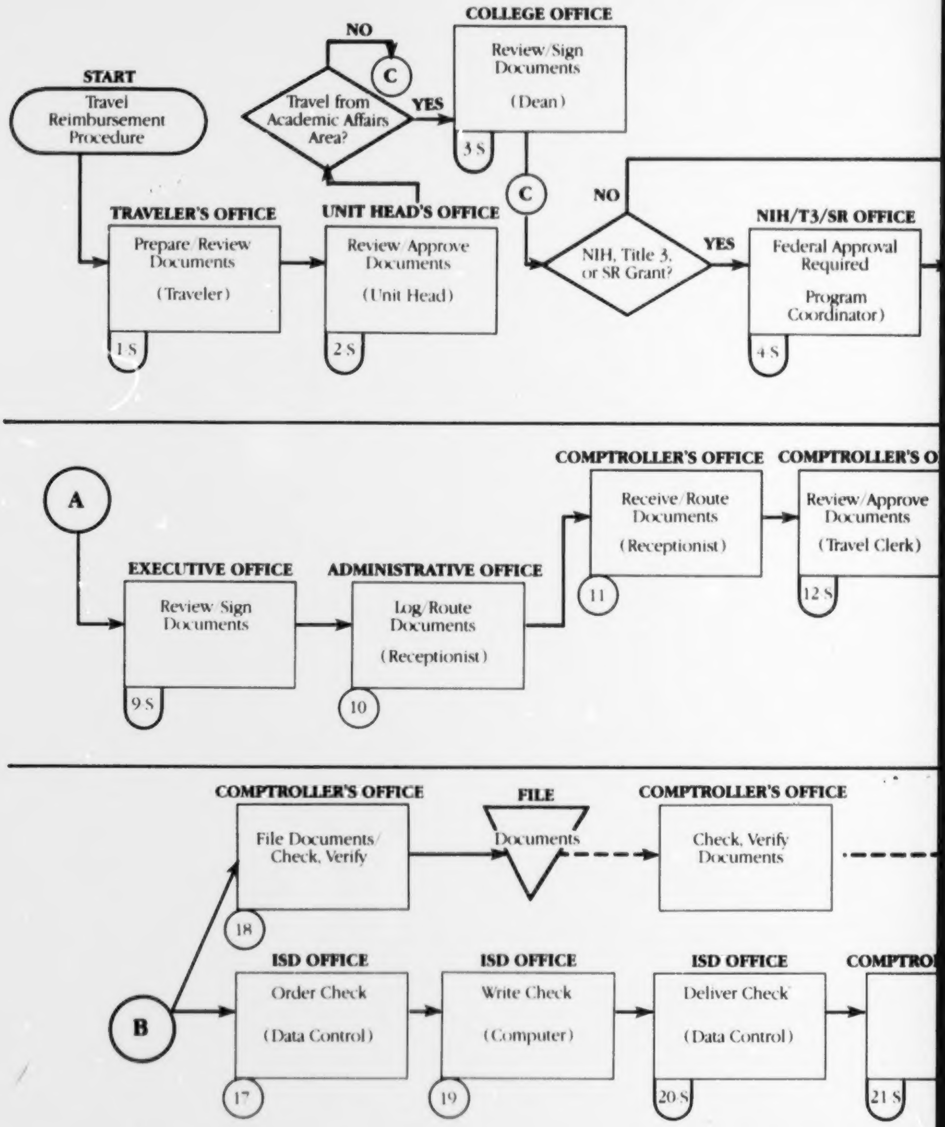
This approach to inputs has an analogy in postsecondary dialogues on the differing requirements of campuses, depending on their mission. The mission of a selective research university is to serve the advanced learning needs of society with new, leading-edge knowledge and graduates who can become leaders in social enterprises of many kinds. It is appropriate for such a university to define well-prepared students and doctorally trained, research-oriented faculty as inputs because they can support the kinds of processes and outputs the university's mission demands. The mission of a community college is to serve the learning, working, and living needs of the people in its service region. Only a small proportion of these people might need advanced education of the type supplied by a research university. Appropriate inputs to the community college process therefore include diverse, teaching-oriented faculty members who relate to the region's people and enterprises.

In neither case is quality defined by the inputs. The central question is whether the input is appropriate for the institution's capacity to meet the needs of its beneficiaries. A faculty member might be right or wrong for the campus, well trained or ill trained to contribute to its processes and outputs. A campus might have a high or low proportion of appropriate inputs. If the proportion is low, quality suffers because processes cannot function effectively to produce needed outputs.

In addition to faculty and student inputs, people in postsecondary education have often looked at financial and capital resources, such as endowment funds or library collections, as key inputs and as indicators of quality. Taking the design-process-output orientation to quality emphasizes that resources too are only "large" or "small," "appropriate" or "inappropriate." They are not "quality." Quality lies in whether and how they are used in the processes that produce the outputs. In taking such measures as indicators of quality, people have been willing to assume appropriate use: If the library is large, odds are it has everything one needs, or if the endowment

FIGURE 3

THE STEPS IN TRAVEL REIMBURSEMENT



START
Travel Reimbursement Procedure
TRAVELER'S OFFICE
Prepare/Review Documents
(Traveler)
1/S
UNIT HEAD'S OFFICE
Review/Approve Documents
(Unit Head)
2/S
Travel from Academic Affairs Area?
NO
C
YES
COLLEGE OFFICE
Review/Sign Documents
(Dean)
3/S
C
NO
NIH, Title 3, or SR Grant?
YES
NIH/T3/SR OFFICE
Federal Approval Required
Program Coordinator)
4/S
A
EXECUTIVE OFFICE
Review/Sign Documents
9/S
ADMINISTRATIVE OFFICE
Log/Route Documents
(Receptionist)
10
COMPTROLLER'S OFFICE
Receive/Route Documents
(Receptionist)
11
COMPTROLLER'S O
Review/Approve Documents
(Travel Clerk)
12/S
COMPTROLLER'S OFFICE
File Documents/ Check, Verify
18
FILE
Documents
COMPTROLLER'S OFFICE
Check, Verify Documents
B
ISD OFFICE
Order Check
(Data Control)
17
ISD OFFICE
Write Check
(Computer)
19
ISD OFFICE
Deliver Check
(Data Control)
20/S
COMPTRO
21/S

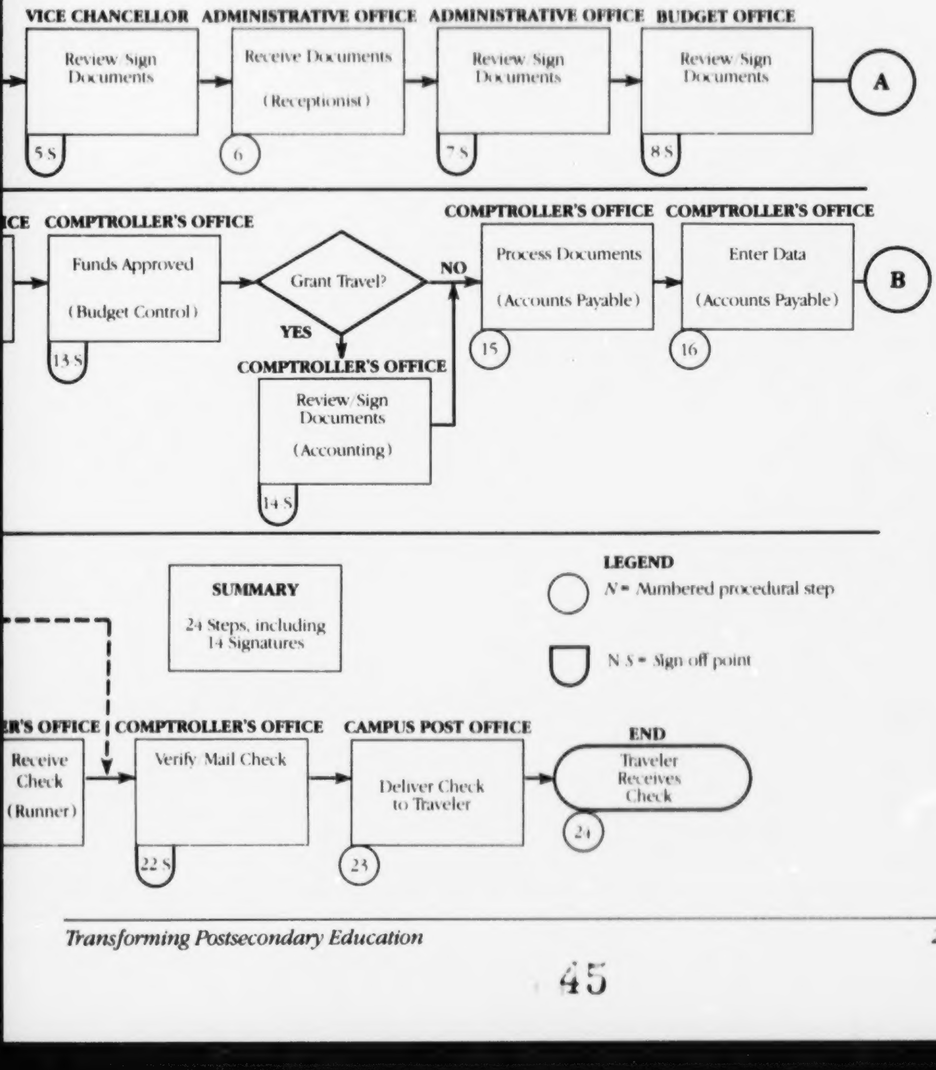
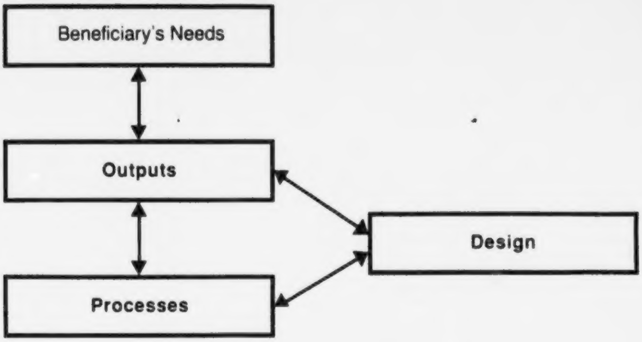

VICE CHANCELLOR
Review/Sign Documents
5 S
ADMINISTRATIVE OFFICE
Receive Documents (Receptionist)
6
ADMINISTRATIVE OFFICE
Review/Sign Documents
7 S
BUDGET OFFICE
Review/Sign Documents
8 S
A
ICE
COMPTROLLER'S OFFICE
Funds Approved (Budget Control)
13 S
Grant Travel?
NO
YES
COMPTROLLER'S OFFICE
Review/Sign Documents (Accounting)
14 S
COMPTROLLER'S OFFICE
Process Documents (Accounts Payable)
15
COMPTROLLER'S OFFICE
Enter Data (Accounts Payable)
16
B
SUMMARY
24 Steps, including 14 Signatures
LEGEND
N = Numbered procedural step
N S = Sign-off point
ER'S OFFICE
Receive Check (Runner)
COMPTROLLER'S OFFICE
Verify/Mail Check
22 S
CAMPUS POST OFFICE
Deliver Check to Traveler
23
END
Traveler Receives Check
24

FIGURE 4

ELEMENTS OF QUALITY



is large, funds are at least theoretically available to enrich the learning environment.

Yet if processes are not functioning well, large proportions of students might never enter the library. If the library has a zillion volumes but a poor collection to support a key program, some students and faculty would not find what they need. If the library has everything this group of faculty, staff, and students needs—and nothing else—funds could be diverted from unneeded acquisitions to more productive uses. Quality lies in design, process, and output; inputs are merely appropriate or inappropriate.

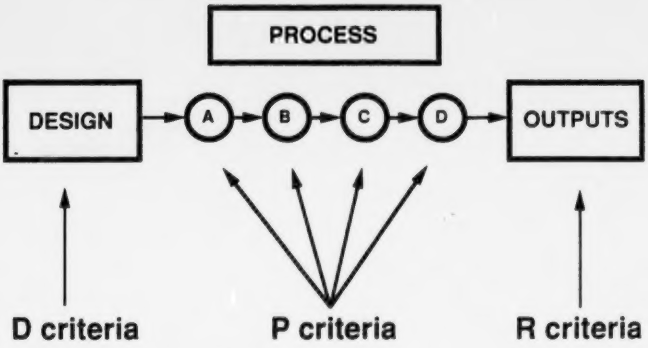
Criteria for Quality

Figure 5 illustrates the relationships among the three kinds of quality in their logical sequence. Two essential elements of TQM are missing from this graphic to permit focus on the three kinds of quality: (1) The driving force underlying and preceding the entire figure must be the needs of the beneficiaries, and (2) continuous improvement requires many iterations of feedback loops within and among the elements of figure 5.

The design of the intended product or service and the process required to produce it come first in sequence. The process consists of a series of steps that use the design plan and yield the output, or result. The quality of the output is closely related to the quality of the design and process. Circles A

FIGURE 5

CRITERIA FOR QUALITY



Adapted from: Imai 1986, p. 18.

through D might represent the freshman through senior years of college, with graduation as the output. Alternatively, we might have a process circle to represent every class meeting or homework assignment, with the output being the course grade.

Tests of the output, like outcomes assessment, are called "R criteria," because they assess the result of the process. Several problems are evident in traditional outcomes assessment in postsecondary education. First, assessments rarely encompass a full understanding of the beneficiaries' requirements because they tend to rely solely on the faculty's expertise. They often omit any serious review of needs as expressed by graduates' employers, retrospective judgments by alumni, or current students. Second, assessments are often made with virtually no understanding of what happened in circles A through D and how each step needs to contribute to achieve the desired outputs. This information helps improve the process and the R criteria. Third, having at best a limited sense of the process, intermediate assessments of process steps are often omitted. These intermediate assessments are P (or "process") criteria. Judgments on the quality of design might be called D (or "design") criteria. They might include analyses of the efficiency of the curriculum, the appropriateness of prerequisite courses, or the need for supervised field experience.

From the point of view of TQM, D, P, and R criteria are important. D criteria focus attention on the beneficiary's needs, the organizational mission, and the program's purpose (design), P criteria provide ongoing assurances that each step in the process is working effectively or immediate feedback on what needs improvement, and R criteria verify that the overall process is leading to the desired result. Whereas outcomes assessment has tended to check quality by the results, organizations should check "with" the results, not "by" them (Imai 1986, p. 46). The point is that if design and process are of high quality, results require only a glance. (See the discussion of benchmarking in the fourth section for more information on interpreting and improving R criteria.)

What quality requires, then, is attention to all the major elements of the production process: design, process, and results. The keystone, however, is process, for two reasons. First, all organizations can easily identify many important problems involving process whose elimination will bring major returns in productivity. Looking at the organization from the point of view of process surfaces new insights that have been obscured by emphasis on results and by departmental boundaries. For example, few people at the university with the travel process depicted in figure 3—even those who might have been frustrated by its results—had any idea how complex the process was because each saw only a small piece of it. Similarly, leaders in a small private liberal arts college knew it was not getting the volume of applications it needed, but they were astonished to find that it took six weeks for them to process the papers through which they responded to inquiries from potential students.

Second, analyzing a process always focuses attention repeatedly on the question, "Why do we do this?" Answers could lead to needed improvements in design, elimination of a step or process, or shared understandings of desired results. In design, we could find that step 10 could be handled better if it were merged with step 2. Analysis of the process might also reveal that we require physical education classes designed for young adults when our objectives could be better achieved for an increasingly older clientele through a requirement for leisure studies.

Moreover, quality requires commitment, especially from leaders. Times and students' needs change much more rapidly than organizations, and financial concerns show no sign of waning. The pursuit of quality is "a race with no finish line," according to David Kearns, deputy secretary of education and former chief executive of Xerox. That metaphor might seem daunting at first. Once people in continuously improving organizations understand the challenge of the metaphor and experience the payoffs of TQM, however, they are exhilarated by the prospect of never-ending improvement. But they cannot take the first step—or the thousandth—without leadership and commitment.

What Does Commitment to Quality Mean?

Deming's first point (table 1) is to "create constancy of purpose toward improvement of product and service." He is talking about making a bedrock commitment to improving quality.

Every time people let something go by, their commitment to quality is in question.

This report began with the assertion that every U.S. college or university is for quality. Their leaders say so, and they believe it. Increasing numbers of students and citizens do not believe it, however. What matters is not who is right in an objective sense; what matters is that many of our beneficiaries are not satisfied. To bridge the gap, we need to *act* on our commitment to quality, first by hearing the complaints instead of denying them, and then by taking that most excruciating step—changing.

If a denial-based, status quo view of postsecondary education seems harsh, consider the number of people and processes in your organization that tolerate inadequate results: the dean who does nothing about faculty with poor evaluations from students, the promotion and tenure system that systematically undervalues effective teaching, or the personnel office that cannot find the records of part-time personnel.

Every time people let something go by, their commitment to quality is in question. In the case of a senior administrator, the commitment of the entire organization is jeopardized. It makes no difference if they are in a hurry, it is "good enough," they have to meet a deadline, or the task is relatively unimportant. People look to each other for standards of quality. Any lapse affects not only the project in question, but also, for administrators, the performance levels of those in their administrative area and beyond.

Recognizing these dynamics, TQM turns the concept of "problems" upside down. People who are serious about continuous improvements understand that problems represent concrete opportunities to improve. Problems are the first step in projects to improve quality (see the next section). Continuously improving organizations have formal processes to encourage both internal and external beneficiaries to identify problems. They dare to do so only because they are willing to listen and they have equally substantive processes to solve problems and prevent their recurrence. They are committed to improving quality.

Demonstrating a commitment to quality could involve a willingness to suspend activities while you fix them, as well as a willingness to invest in "nonproductive" activities that will have long-term payoff. These investments could include additional training or setting aside time for a team to review and repair an existing process rather than seizing a quick fix. Organizational and departmental leaders have a special responsibility to recognize and make these investments to *show* those who work with them that they are committed to quality.

Commitment to quality is impaired by a focus on short-term results; indeed, it is one of Deming's "deadly diseases" (1986). We look for dramatic improvements in one year rather than smaller, more stable improvements in five. We concentrate on immediate deadlines rather than stepping back to determine what our long-term priorities should be. We get bogged down in the wrong details instead of serving our ultimate aims.

One of the reasons we think in the short term is that those above us expect speedy results. Another is that we sometimes do not expect to stay in the organization for the long haul; not only do we not care about the organization's long term, but we also need dramatic results to make our resumes attractive. Administrators need to learn to reward small, solid improvements in the work of those who report to them. They need to keep the organization's big picture vitally alive for themselves and their colleagues.

When they do so in the context of a philosophy of total quality, they find a payoff in satisfied and motivated personnel who participate in achieving organizational aims, satisfied customers, more time to spend on productive activities, less waste, and lower costs. The next two sections show how the process works. Table 2, a statement from the North Dakota State Board of Higher Education to the system's personnel, shows how one governing board explained its reasoning in

TABLE 2

A STATEMENT OF COMMITMENT TO TOTAL QUALITY IMPROVEMENT

- **Why is the North Dakota State Board of Higher Education committed to TQI?**
  The State Board of Higher Education is committed to TQI as a cornerstone of its mission to improve academic quality throughout the system and to seek ever-better ways to meet the state's postsecondary education needs. Achieving this mission requires the efforts of *all* system personnel, and TQI provides the means to develop and capitalize on full contributions by everyone.

- **What does the State Board of Higher Education want and expect from TQI?**
  The State Board of Higher Education wants the system office and every campus to simultaneously improve quality, improve productivity, and decrease cost. Using TQI will achieve those goals. The board expects that full implementation of TQI will ensure that the system and each campus earn significant support from the publics they serve.

- **What are the benefits of TQI for me, as someone who works in the system?**
  The people you work with will want to know what you need to do your job well, and they will strive to provide you with what you need. Your department chair or supervisor will make it a point to remove the obstacles that prevent you from doing your best work. You will meet and work with people from other areas toward the common purpose of making your organization work better in ways that will improve your own work. You will have more time to do important things and spend less time correcting other people's mistakes, worrying about whether some office will ever respond to your request, or doing trivial work. You will gain the satisfaction of making the people around you happy through your work. You will gain the added satisfaction of being able to improve the work processes of which you are a part.

- **What are the benefits of TQI for Students?**
  Students will enjoy greater and more consistent appreciation as key players in the educational process. Faculty and staff will be more interested in knowing what problems students are having so that they can remove those problems. As administrative processes improve, student services will improve and costs will be kept low. As academic processes improve, so will students' learning.

TABLE 2 (continued)

- **What are the benefits of TQI for each campus?**
  Each campus will become an increasingly attractive environment for faculty recruiting, a vital consideration in light of anticipated national faculty shortages. System campuses will improve in their appreciation for faculty and staff work and involvement in decision making. Each campus will experience improvements in students' satisfaction and retention, as students experience more benefits and less hassle.

  Each campus will be increasingly able to document its results and improvements over time. They will be able to demonstrate high levels of quality, efficiency, and accountability to the public and to potential students.

- **What are the benefits of TQI for the state?**
  North Dakota will enjoy a higher education system that is demonstrably a national leader in quality, productivity, and efficiency. The system's commitment to state service will be increasingly evident.

Source: North Dakota University System 1991.

making a commitment to TQM (which it calls Total Quality Improvement [TQI]) and the benefits it expects.

Summarizing Quality

This section has reviewed key points in a new understanding of what "quality" means. To continuously improve quality, we need to understand that:

1. Colleges and universities, as organizations and department by department, exist to serve others. Whether we call these others "customers," "beneficiaries," or by some other term is less important than understanding the need to know who these people are and what they need. Their needs become central to the definition of quality.
2. We have many different beneficiaries, and sometimes their needs conflict with one another. TQM does not provide any magic formula for resolving these competing pressures; campus personnel must still apply their judgment in these matters. What TQM does provide is the perspective that such judgments should be decisions among competing needs of beneficiaries, not short-term fixes to meet the needs of the organization itself.

3. Each organization must develop its own definition of quality. No single correct definition exists. Engaging in the process of developing this definition is a central organizational task.
4. Quality must be understood in terms of design, process, and output. Where possible, each organization must determine its own measures of quality.
5. The notion of continuous improvement applies not only to functional organizational processes, but also to the process of defining quality. A perfect definition of quality will never be found, and the needs of beneficiaries will change. Thus, we must work on improving our processes while continuing to refine and reshape our definition of quality.

> *If you always do what you've always done, you'll always get what you always got* (Urbanski 1991, p. 34).

Quality is more than "absence of problems," but problems are a clear indication of inadequate quality. One report notes that "slashed budgets force students to delay graduation plans and change majors" (Dodge 1991b). More than one student has broken into tears of desperation during an attempt to register for classes, and, on one campus, many students missed entire days of classes trying to drop and add courses (Dodge 1991b). These students are not experiencing a quality education, regardless of excellent instruction in the classrooms. They are missing classes to deal with logistics, taking "filler" classes that do not meet their educational objectives, taking sequenced courses out of sequence, and stopping out or transferring elsewhere.

The report attributes these problems to "slashed budgets," and funding cuts are a proximate cause. Restoring the funds might or might not solve the problems, however; campuses have many pressing claims against any additional funds, and railing against unappreciative government budgets certainly will not solve anything. Administrators and faculty might go to great lengths to accommodate students' needs in these stressful conditions, but they might not take steps to remove the causes of those conditions. Clearly, they will make maximum efforts to restore adequate funding, but they could do more.

What they could do is view these problems as signals that there is room to improve their processes, such as course scheduling, faculty and room assignments, curriculum requirements, student advising, and admissions. The overload of demand for courses is not just because of sudden budget cuts, but also because of their impact on a vast array of traditional assumptions, incentives, and procedures.

Typical administrative responses to this kind of exigency might include replacing full-time faculty with part-time instructors, reducing the number of new students admitted, and moving classes to larger rooms to accommodate larger groups. While these actions could alleviate stress in the short term, they could have undesirable long-term consequences.

In other words, administrative responses often deal with symptoms, not root causes, of problems, and they often take a short-term view. Suppose administrators decided to deal with the problem. How would they define it? One option is "overcrowded classes." Others include "not enough money," "inability to offer enough course sections," "disruption of normal student academic progress," or "more demand for classes than supply." How they define the problem substantially affects the kinds of solutions they see, yet few administrative teams take the time to develop the definition of a problem.

Having agreed on the definition of a problem, campus personnel are better equipped to seek and eliminate the root causes of the problem. They can do so through the same kind of scientific approach they espouse as academics. For example, they can collect data on the nature and magnitude of the problem, review any existing literature, develop hypotheses about the causes of the problem, and test those hypotheses with data.

Such an approach might yield surprising information. Perhaps the course inventory has burgeoned while no one was looking, and many courses could be eliminated. Perhaps new technology would permit faculty to effectively teach many more students than before in some classes. Sometimes a department continues to require a course long after the lone faculty member who championed it is gone.

This section reviews some of the conceptual and operational tools that TQM offers for identifying problems, finding their root causes, and eliminating those causes. This element of TQM is often called the "quality improvement process." Quality improvement also requires supportive changes in administration and perspective, which are described in the following sections.

This section includes relatively detailed attention to the inner workings of organizations—details that senior administrators might see as too operational for their attention. A fundamental premise of TQM is that quality *is* attention to appropriate detail, which does not mean that administrators necessarily become personally involved in such operations, at least not routinely. It means that administrators must understand why detail is so important and that they must learn to identify the details that require organizational attention. We cannot provide a list of "key details," because they vary not only from one organization to the next, but also over time within a single organization. TQM requires top-level commitment and top-level understanding of how the organization really works. The following illustrations help top-level administrators see why it is the case.

How Does Quality Improvement Work?

Understanding TQM requires recognizing that all work is part of a process (see figure 5). For example, fund-raising campaigns start with identifying goals and strategies, move into identifying and training volunteers, go on to contacts with potential donors, and ultimately yield funds. Each stage involves many other series of steps, each of which can also be seen as a process. Another example, central to the mission, is the educational process itself, in which a student enters the institution with certain knowledge, skills, and attitudes and proceeds through a series of courses and other experiences that change knowledge, skills, and attitudes. Colleges and universities also have processes that lead to sales of season tickets, mailings of many kinds, the appointment of a staff person, a well-oriented governing board, teaching a class, defining a curriculum, producing an event or a paycheck, and many more.

The idea that work is a process allows us to develop effective methods of improvement that can increase quality and productivity while also decreasing cost. As an analogy, consider the manufacturing organization. When a completed gizmo arrives at the end of the production line, quality inspectors might examine each one. They remove any gizmo with a defect (if they detect it), and the imperfect gizmos go either to the scrap heap or back for rework. But what if the defect is not visible? What if the inspector is tired?

Some imperfect gizmos go the consumer, who becomes unhappy. And whatever the cost of scrap and rework to the organization, the consumer ultimately pays for it or the firm goes out of business. Manufacturers increasingly are realizing that they cannot inspect quality into a product at the end of the line. Relying on inspection involves cost to consumers, dissatisfied consumers, and workers who cannot take pride in their work. The remedy is prevention—doing it right the first time. A continuously improving organization can use the idea of doing it right *every* time as a goal to keep itself focused on continuous improvement. Participants also share a deep understanding of the concept of variation, however; they know that perfection is impossible and that mistakes are important opportunities to learn how to do better.

Making gizmos has analogies in campus functions. Suppose your gizmo is a matriculating student. The admissions office staff monitors random calls and discovers ineffective, even harmful, practices. How many potential students have you lost? Will you ever be able to change their attitude toward your campus? How many friends will they tell?

The only way to prevent such calamities is to build quality into every step of every work process. In the example of admissions, improving the staff's performance takes us back to the staff training program, which takes us back to the student recruiting philosophy. Ultimately, the goals and performance record of the college itself are intrinsic to a successful admissions office. Improving quality must address every step of every process in the organization, including those that make up the daily work of all personnel.

The example of admissions illustrates the concept of the costs of good and bad quality (Evans and Lindsay 1989, pp. 33-35):

Cost of quality = Prevention costs + appraisal costs + cost of internal failures + cost of external failures

where,

Prevention costs = the costs associated with ensuring that mistakes do not occur (such as training the staff)

Appraisal costs = the costs of reviewing the product or service to ensure its quality, preferably before delivery (such as monitoring calls to the admissions office)

Cost of internal failures = the cost of failure inside the organization (such as fixing mistakes in students' records)

Cost of external failures = the cost of failure outside the organization (such as loss of new students).

We do not have good measures of the costs of internal or external failures, but they are often substantial—so much so that a company should not be run on visible figures alone (Deming 1986, p. 121). By spending more time and sometimes money on prevention, the organization can reduce the cost of failures. As the process is improved, the cost of appraisal can also go down.

Like recruiting students and other typical processes, quality improvement itself is a process—the process of applying the scientific method to your work. The literature on TQM often refers to this idea as "the Shewhart cycle," "Plan-Do-Check-Act," or "the PDCA cycle" (Deming 1986, p. 88). First, *plan*. Spend adequate effort to understand the nature and causes of a problem, collect data on it, and use the data to inform your definition of the problem, your understanding of its root causes, and your decision about potential solutions. Use the data to develop a theory for process improvement—if we do such and such, the process will improve in these ways for these reasons. Then *do*—try your solution in a limited way to be sure it works—and *check*—did the solution work as intended, or does it need revision? Collect data at this stage too to be sure that the new process is better than the old one. Finally, *act*. When you are satisfied with the results, implement your solution permanently in all areas where it is relevant.

The PDCA cycle is the general framework within which people use many of the tools described later in this section. It usually requires the efforts of a team with members from various roles and departments, because important processes usually cross departmental and functional lines. Deliberate use of the PDCA cycle always takes what seems like a long time. Devoting such time is worthwhile, however, because the solution is likely to prevent the problem's arising ever again.

Being systematic in your efforts to improve operations is an obvious component of good management. Yet once you become aware of it, you will notice an astonishing number of cases where individuals and groups leap from "I think we have a problem with this" straight to "Here's how to solve it." They usually do not define the underlying disease but use their intuition to treat symptoms. You will also notice that quick "solutions" in one area often cause unanticipated problems in another, because no one from the second area was involved in developing the solutions. For example, one campus discovered one important reason that it took so long to get recruiting materials to prospective students was that three different offices over the years had decided they needed names and addresses of prospective students as early as possible. No effort had been made to meet all their needs with a single list available to all, so the prospective student's inquiry made a long journey around the campus before being fulfilled. In addition and all too often, quick solutions do not really solve the problem. Moreover, quick solutions usually involve making a process more complex by adding steps, when revising or even eliminating steps could well be more effective solutions.

The importance of eliminating steps where possible needs emphasis. People generally agree that if an individual can do a job correctly 99 percent of the time, he or she is performing quite well. A process requires a number of steps, however, and the accumulation of errors through these steps is not generally understood. If a process has 10 independent steps and each step is performed at a 99 percent level, then only 90.4 percent of the output will go through all 10 steps without error. The remainder will be discovered and reworked or scrapped, or the product will be passed on to the final beneficiary. Table 3 shows what happens as the number of steps increases.

TABLE 3

ACCUMULATION OF ERRORS IN COMPLEX PROCESSES

Number of	Percent with No Errors		
Steps	99%	99.7%	99.999966%
1	0.9900000	0.9970000	0.9999997
10	0.9043821	0.9704018	0.9999966
20	0.8179069	0.9416796	0.9999932
50	0.6050061	0.8605140	0.9999830
100	0.3660323	0.7404843	0.9999660
500	0.0065705	0.2226277	0.9998300
700	0.0008803	0.1220705	0.9997620
1000	0.0000432	0.0495631	0.9996601

Most organizations seem to operate in the 99.7 percent column. Thus, if it takes 10 steps to register a student, one would expect 97 percent of the students to be registered correctly. If the example of reimbursement for travel shown in figure 3 is operating at this level with its 24 steps, one would expect slightly less than 94 percent of the reimbursement checks to be accurate. Notice that eliminating steps can actually improve the result: If travel reimbursement can be cut to 10 steps without changing the rate of error for each step, (1) three more checks out of every hundred will be accurate, (2) the elapsed time for reimbursing the traveler is likely to be shorter, and (3) the time cost of reimbursing travelers is likely to go down both because of less processing time and less time spent correcting erroneous checks. The final column in table 3 shows what Motorola is trying to accomplish in all its processes—manufacturing as well as administrative processes like payroll and producing technical manuals. Motorola calls its initiative Six Sigma, which would yield an error rate of 3.4 per million.

Many people mistakenly think that error or defect rate applies only to manufacturing. Not so. A defect can be defined as any source of variation that causes dissatisfaction for the beneficiary. Thus, defects include such items as a periodical misfiled in a library, incorrect graduation requirements in a catalog, an equation on the blackboard that students cannot read, and so on. Each of these defects has costs, and reducing the defect rate will improve quality.

A defect can be defined as any source of variation that causes dissatisfaction for the beneficiary.

What Are the Technical Tools of Quality Improvement?
TQM offers a wide array of tools to improve process, to be used within the PDCA cycle (see Brassard 1989 and GOAL/QPC 1988 for summaries of tools for practical applications). The flow chart is an essential tool that helps people visualize the work process.

To illustrate flow charts during campus TQM seminars, we often ask participants to identify some of their own processes. They propose processes like changing the curriculum, reimbursing travelers, hiring a new person, or purchasing equipment. We select one that participants agree is relatively simple. For this illustration, we use purchasing equipment.

We ask who has recently purchased equipment. Alice ordered four monitors for the Learning Skills Center. Alice joins us at the front of the room, and we interview her about what she did to initiate the process on behalf of her unit director, Betty. Alice filled out a form on Monday, gave it to Betty to sign, and sent it to Calvin, the director of student services. Betty and Calvin join Alice at the front of the room.

"How do you decide whether to sign the form?" we ask Betty.

"I sign if the equipment is in our plan and our budget."

"Have you ever not signed a form?"

"No."

Calvin gets the form on Tuesday and signs it. He always signs Betty's forms because she never exceeds her budget, and he sends it to Diane, the vice president.

Diane gives a similar report. She notes that she is very busy and that she might be off campus on Tuesday. It could be

Wednesday or Thursday before she sends the form to the purchasing department.

The lineup is getting long. At the purchasing office, Elaine receives the request for equipment and verifies the accuracy and completeness of the form. If it has the wrong budget code, she sends it back to Alice for correction. If it requires bids, she prepares the request for bids. She also uses a current budget status program to verify that the Center has a sufficient fund balance for equipment. Because purchasing is across campus from Diane's office, Elaine gets the form on Thursday or Friday. Fred, the purchasing director, signs all the forms Elaine gives him. Elaine estimates that, campuswide, she places orders from five to 21 days after the form is initiated. After Fred signs, Elaine sends copies of the order to Alice and to the receiving department.

With six people now at the front of the room, it becomes clear that vendors are not fully to blame for any delays in receiving equipment. Through discussion, we often determine that:

- Alice is probably using an outdated vendor catalog and, because she rarely orders equipment, she does not understand all the campus budget codes.
- Many participants in the process have only vague ideas about what they are supposed to verify before they sign.
- Some do not have access to correct, current data that would allow them to verify whether they should sign or not.
- Although everyone signs 99 to 100 percent of the time, sometimes the wrong equipment arrives and sometimes budgets are exceeded.
- Elaine has one or more problems with an estimated 40 to 50 percent of the forms she receives.
- Elaine routinely checks budget status and can do so more quickly and accurately than Betty, Calvin, or Diane.
- If Diane has three forms from different departments using two different codes for similar purchases, she might change one to the same code as the other two in an effort to help Elaine. Sometimes she is not really sure which code is wrong; she assumes that the majority are accurate.

Someone in the audience suggests eliminating Calvin and Diane from the process, noting that Betty and Elaine check the budget and Diane's "corrections" could be introducing errors. Diane says that would save her five to ten minutes a day on average, but she wonders whether people at Betty's and Elaine's level should be expected to carry that much responsibility. She asks Elaine whether her corrections are helpful. Elaine evades the question.

A person from the business office notes that the auditors require signatures from both the director and the vice president. Some debate ensues about whether the requirement is for two signatures or for signatures from specific officers and about what role the board's policy plays in the process rather than auditing rules.

We ask who is the customer of this process. "The students who will use the monitors." "Who else?" "Alice and Betty." Soon we agree that students, Alice through Fred, the receiving office, and the vendor are all customers. We ask several of them what they need from the people who are "upstream" from them in the process. Alice learns of the hassles Elaine faces when campus or vendor codes are incorrect or out of date. She asks how to get it right the first time.

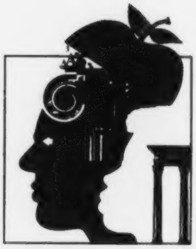
Gene, a faculty member in the audience, then points out that he routinely circumvents the process when he is in a hurry. He places the order directly with the vendor, then puts through an expedited purchase order. He knows this tactic works for him, but he wonders whether it causes problems for others. Almost everyone is stunned by this revelation. Elaine and someone from receiving say their only problem occurs when the product or invoice arrives in their office before the purchase order.

This example allows us to demonstrate the concept of work as a process, the idea of upstream suppliers and downstream customers, the excess of inspections even in a "simple" process, the uncertain value of many inspections, the unnecessary complexity of processes, and the extent to which a surprising number of departments are interdependent in ways they had never imagined.

The flow chart

The "human flow chart" is a dramatization of what could be the most fundamental and useful tool in TQM. Figures 2 and 3 present examples of flow charts, although figure 2 is highly simplified. Depending on circumstances, flow charts could show how the process *really* works or how it is *supposed* to work. A real flow chart can reveal unnecessary complexity; an ideal flow chart can generate innovative ideas for dramatic change. A key point is not to assume that the ideal is what actually happens.

The only way to know how processes really work is to ask each person to explain his or her actions in the process—often yielding surprises. A physical facilities department found such surprises when it wished to reduce its number of complaints about slow responsiveness to requests from other departments for services. The department manager's first surprise was how much time the process really required; she thought it took an average of 10 days from request to completion, but by examining recent events, she found it was 20 days. While interviewing the people who handled the process, she found that the department secretary automatically held all requests for 10 days before forwarding them to the facilities superintendent—her second surprise. Why the 10-day delay? "That's what my predecessor told me to do." If she were to call the predecessor, the manager might discover that the previous manager had ordered the 10-day delay because those requesting services often changed their minds about the services they wanted during or after the facilities work. The 10-day lag was a "cooling-off" period so that those who requested services would be sure of what they really wanted.



The process for reimbursing travel expenses in figure 3 is very complex. Does the campus really need all those steps just to repay travel expenses? A team of experienced travelers and financial staff could begin with understanding why the process exists: What are its purposes? They could then identify steps that are redundant or that no longer contribute to the purpose; perhaps some steps were necessary before they started managing with computers but now could be eliminated or automated. The team members might determine for each step whether it adds value or only adds cost, whether a time cost or a financial cost. What steps generate a number of complaints? Where are the bottlenecks? Simply holding serious analyses among a team of those involved in the process often generates improvements. But other tools are also available.

The cause-and-effect diagram

The cause-and-effect diagram, also called a fishbone diagram because of its underlying shape, is a good way to begin looking for less obvious improvements. Figure 1, in the first section, shows a cause-and-effect diagram for the delivery of a course. To continue the example of reimbursement for travel, suppose travelers complain about inaccurate travel checks. Without a process analysis, administrators might decide to add a final inspection by the comptroller before issuing the check—a new step in the process. Doing so might reduce the errors (if the comptroller is not tired or busy with other matters), but it does not eliminate the cause of errors. It also increases costs. Having prepared a flow chart, the quality improvement team would not be inclined to further complicate the process. Instead, they will want to prevent error, which requires identifying the causes of error.

Figure 6 presents a diagram that the improvement team could develop by brainstorming and reflecting on their own experience. They array their ideas in groups. In the "methods" category, they suspect that most travelers do not understand the form requesting reimbursement. In the "people" category, they note the possibility that error most frequently occurs with respect to those who travel least. In the "machines and equipment" category, they suppose that the computerized system for matching travel claims against budget categories is not working properly and is causing "corrections" that reflect the budget rather than what is owed the traveler.

Armed with these ideas, the team is in a position to look systematically for the root causes of error. They do so by collecting data. They might interview travelers and financial staff regarding the nature and extent of their difficulties with the process, categorizing the replies, determining which category has the greatest number of complaints, and using this information to refine the cause-and-effect diagram. They could also verify the accuracy of each check in a given month and trace each error back to its cause. They could determine how long it takes to complete each step, remembering that time is money because wasted time could be put to more productive uses. When the data identify a root cause of error, the team moves from "plan" to "do" and "check" in the PDCA cycle by developing and experimenting with a recommendation for eliminating the cause.

Run charts

Using some of the additional tools in TQM, the team reviewed actual experience with reimbursement checks over the pre-

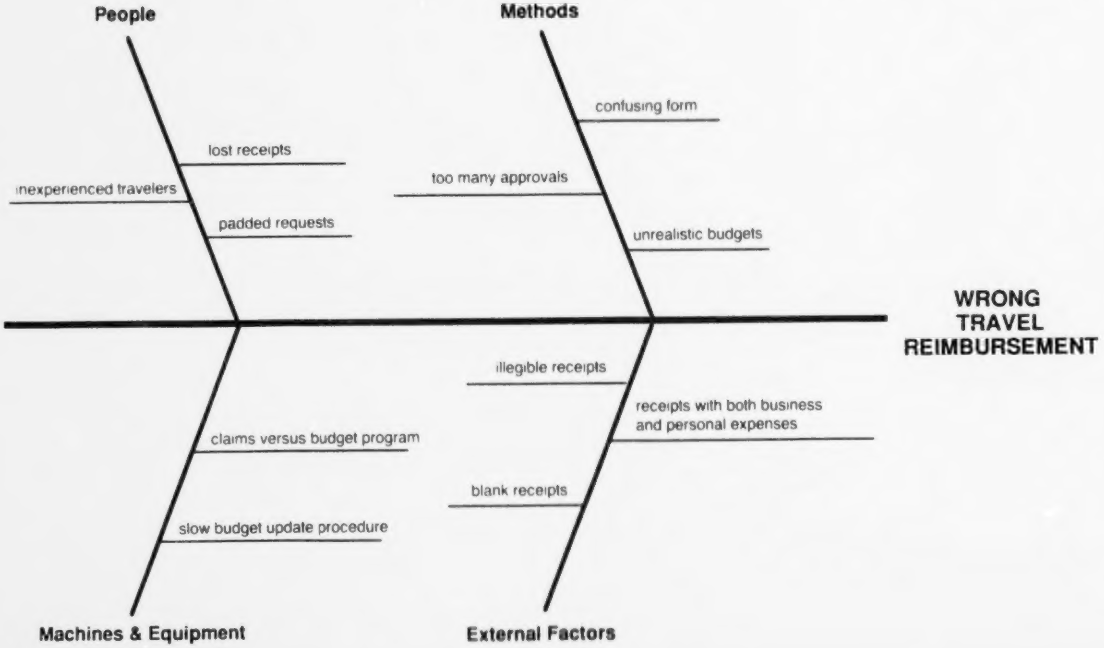

People
Methods
lost receipts
inexperienced travelers
padded requests
confusing form
too many approvals
unrealistic budgets
WRONG
TRAVEL
REIMBURSEMENT
claims versus budget program
slow budget update procedure
illegible receipts
receipts with both business
and personal expenses
blank receipts
Machines & Equipment
External Factors

FIGURE 6
CAUSE-AND-EFFECT DIAGRAM

vious 12 months to see whether errors were cyclical. They graphed the results by the number of errors each month and the proportion of erroneous checks. Figure 7A is a run chart by number of errors; figure 7B is a run chart by proportion of errors. Examining figure 7A, the team noticed that periods with a high number of errors correspond to the times when most faculty travel—midfall and midspring. The more traveling, the more errors in the reimbursement checks. The team theorized that something systematic was creating errors in the reimbursement process. Perhaps the faculty did not understand the form requesting reimbursement. Perhaps the business office was not equipped to accurately handle high volume.

The team decided to test both theories. They took random samples of reimbursement forms for faculty and other staff and checked their accuracy. Team members interviewed business office personnel, asking about possible shortcuts or other changes they experienced in high-volume periods. They found the same proportion of errors among faculty and other staff. They also found that the business office experienced so many diverse demands in midfall and midspring that it hired temporary personnel during those periods to handle routine procedures. Having zeroed in on a possible root cause of errors, the team worked with the business office to determine whether better training for temporary personnel, reassigning processing of travel claims to permanent personnel, or other approaches would work best to eliminate the errors.

The evidence of a "temporary person effect" signifies what is called a "special cause." That is, this cause of error is not part of the routine procedure. Whenever a team discovers a special cause, its first task is to eliminate that cause. Most often, eliminating special causes does not create a perfect process. Errors continue to occur in the routine procedure. The causes for these errors are called "common causes."

Variability, control charts, common and special causes

Statistical process control uses statistics and control charts to study variability. Understanding variability is fundamental to understanding improvement in quality. Thus, although postsecondary institutions might find fewer uses for control charts than manufacturing organizations require to assess and improve the quality of their products, we still must understand the concepts that underlie control charts and statistical process control.

FIGURE 7A

RUN CHART FOR NUMBER OF ERRORS

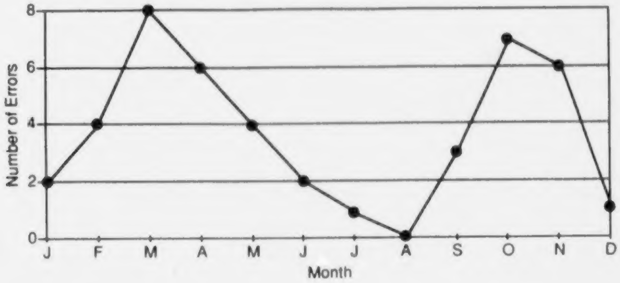
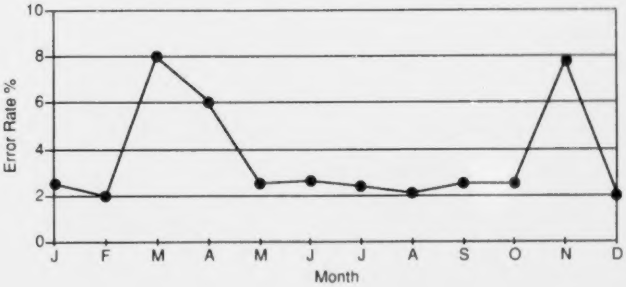


FIGURE 7B

RUN CHART FOR ERROR RATE



Variability is universal. Your left foot and your right foot are not exactly the same. A secretary typing the same memo twice will not use exactly the same process both times. Even the stereotypical burned-out professor with yellowing lecture notes will not teach the same class twice. The concert pianist might give two stellar performances of the same piece, but the performances will not be the same. The keys to continuously improving a process are to narrow the range of variations, move the average performance toward the desired goal, and eliminate unexpected and undesirable sources of variation.

Manufacturers find the control chart a fundamentally important tool toward these ends, and the control chart is applicable to many processes in postsecondary education as well. Much of our most important work, however, does not yield to data collection, which is essential for control charts. In those cases, we can apply the analogy by knowing what our goals are, reducing the likelihood of undesired sources of variation, and understanding the sources of beneficial variation.

A process is said to be in control if the process is stable and predictable; otherwise, the process is out of control.

A process is said to be in control if the process is stable and predictable; otherwise, the process is out of control. A stable, predictable process still exhibits variation, but the causes of the variation are built into the process—"common causes." The secretary might sit differently and have a different angle of approach to the keyboard the second time through the memo. If the process is out of control, then in addition to common causes, "special causes" will be present. The receptionist might take a break and the telephone then interrupt the secretary during the second typing of the memo.

A control chart, which is an enhanced run chart, can show whether the variation in the process is caused by only common causes or by both common and special causes. The control chart displays the data in a way that reveals which errors are within the boundaries of variation one should expect in any process (as a result of common causes) and which errors are beyond the boundaries of normal variation (as a result of special causes). The control chart thus helps determine how to go about improving the process—first by removing special causes and then by working on common causes (see Wheeler and Chambers 1986 for a comprehensive discussion of control charts and the next section for an example).

Special causes and common causes require different kinds of treatment. Solutions to special causes typically involve isolating the special cause for a one-time fix, such as deciding not to use temporary personnel to perform certain duties. Solutions to common causes typically involve changing key elements in the process, such as eliminating an inspection. Variation resulting from common causes is not the fault of the worker.

Suppose an organization changes its voucher system because someone cheated—treating a special cause (one person cheated) as if it were a common cause (any or all people would cheat). When an organization treats a problem with a special cause as if it had a common cause, the organization tends to waste time and energy, divert attention from central concerns, introduce even greater variability in the error rate, reduce productivity, and reduce morale. The greatest consequence is that the problem continues and the "solution" will not work (the cheater finds new loopholes or begins to cheat on another process).

On the other hand, suppose an organization blames personnel who do not fill out a form properly when the form itself is confusing. It might add inspection steps or training steps to the process rather than clarifying the form to prevent the need for special inspections and training. When an organization treats a problem with a common cause as if it had a special cause, the consequences include higher costs, more complexity, more variability, and lower morale. Again, the problem continues because the "solution" is inappropriate (inspections are never perfect and personnel could forget the training).

Not only do common causes and special causes require different kinds of treatment; the method to determine the appropriate treatment is also different. A problem that is the result of a special cause is localized and unusual. To deal with it:

1. Work with timely data so that special causes are signaled quickly.
2. Upon finding a problem resulting from a special cause, search immediately for things that were different from other occasions.
3. Seek to eliminate the temporary or local problem; do not make fundamental changes in the process.
4. Take steps to prevent the special cause from recurring.

Common causes are part of the process. Nothing is gained by trying to find out what was different on this occasion.

Rather, one must address aspects of the process that are always present. Doing so is usually more difficult, but the appropriate steps include:

1. Interviewing many different people in the process to get their ideas;
2. Identifying and ranking categories of problems;
3. Investigating potential cause-and-effect relationships;
4. Stratifying your observations to compare performances of subprocesses;
5. Running statistically designed experiments to test your hypotheses about causes.

One final caveat is also in order. On occasion, unusual results are not caused by the process but rather by the measurement. Care should always be taken to ensure that those who are collecting the data do so consistently.

Notice that figure 7B shows a constant small error rate during most of the year—times when the regular account technician is on duty. Common causes are the source of this error rate, and common causes are often difficult to detect. To avoid the extra time, cost, and hassle of producing erroneous travel reimbursement checks, the quality improvement team set out next to identify the common causes.

Check sheets and Pareto charts

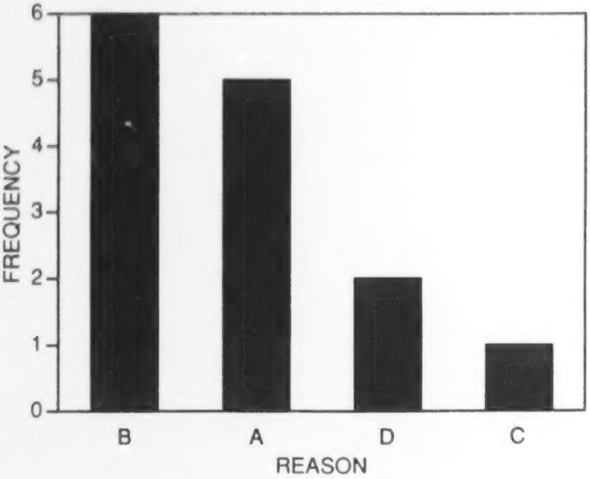
The team learned through talking with participants in the process that error could come from many different people who either created the numbers that generated an individual's reimbursement check or amended the numbers as the paperwork flowed through the process. The team identified all erroneous checks for the previous three months and traced each one through the process to find out where the error began. Compiling their results, they created the check sheet in figure 8. To make the results easier to "see," they used the results of the check sheet to make the Pareto chart in figure 9. (A Pareto chart is simply a bar graph with the bars arranged in descending order. The arrangement highlights the most frequent concerns by clustering them at the left end of the chart. They are the concerns that warrant early attention.)

Noting equally high errors from both travelers and the manager and noting that these errors were the most frequent, the team reviewed the details of these requests and interviewed

FIGURE 8
CHECK SHEET

	REASON	FREQUENCY
A.	Travelers request incorrect	𝍸
B.	Manager changed request	𝍸 I
C.	Request lost in assembly period for trip	I
D.	Request lost in assembly period for month	II

FIGURE 9
PARETO CHART



the individuals involved. They found that all these requests involved personal auto expenses, an unusual item. The mileage reimbursement rate for the university was not included in the instructions that accompanied the reimbursement form, and everyone had a different idea about what the rate was. The solution was to print the mileage reimbursement rate on the instruction sheet. As the team monitored travel checks for the next several months, they found the error rate dropped considerably. The team went on to look into the matter of lost forms.

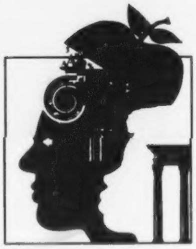
The value of technical tools

Process analysis using the PDCA cycle and the technical tools of TQM shows us that experience is not, after all, the best teacher of how to do things well. The missing links in that aphorism are the theory of improvement in quality and the need to *analyze* experience to find out how to improve performance. Experience is not the best teacher; properly interpreted data can teach us better. Without a disciplined approach to solving problems, we often solve the wrong problem, treat only the symptoms instead of removing their root causes, and create new problems in our efforts to fix old ones.

How to Achieve Continuous Improvement

In explaining the process of improving quality and the tools of TQM, we have provided the building blocks of continuous improvement. Now we can step back and look at the big picture.

Imagine a campus where all offices approached their work using these ideas and where dozens of cross-functional teams of faculty, staff, and students each undertake specific projects to improve quality—upgrading academic programs, campus security, food service, parking, relations with potential students, registration, advising, and numerous administrative processes. Each team defines its goal and, upon reaching its goal, disbands or defines a new shared problem. Each member could serve on one or more teams at any given time. The organization systematically seeks out new problems and forms new teams to solve them. The faculty conduct action research, in collaboration with their students, to continuously improve instructional effectiveness in their classrooms. As each team reaches its goals, it increases productivity, creating time for people to identify and resolve more problems.



In the first year, such activity could have the following results:

- Cut 10 percent off utility bills.
- Correctly assign 99 percent of new students to entry-level courses appropriate for their abilities.
- Cut complaints about parking by 50 percent and cancel plans for a new parking lot.
- Cut by 90 percent the time students spend in lines.
- Reach 40 percent more potential new students in half the time.

In later years, as improvements in quality compound and mature, results might include:

- Improvement in employers' satisfaction with graduates by 80 percent;
- Improvement in job placement for graduates by 70 percent;
- A cut in the cost of recruiting a new student by 50 percent;
- Improvement in students' satisfaction with instruction by 100 percent;
- A rise in graduation rates from 52 percent to 80 percent of the matriculating class;
- A rise in tuition at or below the inflation rate each year.

Moreover, although these changes are impressive, the most important organizational changes are those that lie behind these lists and are more difficult to express. The campus will be a different place from what it was before. It will be the kind of place that faculty, staff, students, donors, employers, taxpayers, neighbors, and legislators are delighted to support. It will value them in every way, providing an environment that supports their efforts to surpass themselves—and have fun doing it.

Achieving such results is both desirable and feasible when everyone on campus is entrusted and equipped to participate in improving quality. The next section focuses on supporting those efforts.

Summarizing the Technical System for Quality Improvement

While this section has focused on tools, TQM is not the tools presented here or elsewhere. TQM is a comprehensive philosophy of living and working in organizations. Nevertheless, TQM requires people who understand and can act on the key ideas of this section:

1. You cannot inspect quality into a product or service at the end of the line. Quality requires not just the detection of defects, but also their prevention. Detecting defects is only a means of initiating action to prevent their recurrence ever again. Preventing defects requires identifying and eliminating the root causes of problems through the Plan-Do-Check-Act cycle.
2. All work is a process. The details of organizational processes are important because they are the substance of organizational work that ultimately produces the results. If the details are wrong, the process is wrong. If the process is wrong, the results are wrong. Quality requires attention to detail.
3. You cannot improve a process without data. Data are often numerical, but they might also include characterizations of how a process really works or other kinds of facts. In virtually every process to improve quality, participants learn by using the PDCA cycle that their initial judgments about the nature of the problem and its root causes are at best partially supported by the data. Often the data yield surprises.
4. Common causes of problems are inherent in every process and are not attributable to the worker. Only a data-driven, scientific approach that involves participants in the process can identify and eliminate common causes. Because processes typically cross organizational boundaries, solving problems often requires participation by teams that represent various involved departments and multiple job categories.
5. Special causes of problems come from exceptions to the normal process. Eliminating them requires detecting them as quickly as possible.
6. Problems associated with common causes require changes in the system, while problems associated with special causes require special actions. Two types of errors are not only possible but also frequent: (1) treating a special problem as if it had a common cause, and (2) treating a common problem as if it had a special cause. These errors typically make the situation worse.

7. Adding steps to a process adds opportunities for new problems. Make each process as simple as possible to improve quality.
8. The tools presented in this section do not constitute TQM. Rather, TQM is a change in perspective that is indicated by all the ideas in the second, third, and fourth sections. The tools in this section are useful instruments for those who have come to understand the importance of a continuous improvement in quality.

> *Quality control begins with education and ends with education* (Ishikawa 1985, p. 37).

> *For 25 years, you've paid only for my hands, when you could have had my brain for free.*
>
> —Worker in a Fortune 500 company

W. Edwards Deming often uses the Bead Game to illustrate several key points (Walton 1986, chap. 4). The data in table 4, from the Bead Game, show the number of defective beads produced by five individuals in a production line on each of four working days. The larger the number, the worse the production. The goal is no more than five defects per day per person—20 or fewer per person in four days, 25 or fewer per day for all workers.

TABLE 4

PRODUCTION OF DEFECTIVE PARTS

Name	1	2	3	4	Total	Goal
Gloria	6	12	7	9	34	≤ 20
Carol	7	7	8	6	28	≤ 20
George	4	6	3	8	21	≤ 20
Allen	9	8	7	5	29	≤ 20
Lee	6	9	7	7	29	≤ 20
TOTAL	32	42	32	35	141	
Goal	25	25	25	25		≤ 100

The data come from the following process. A large bowl contains 1,600 white beads and 400 colored beads. Colored beads are defects. Employees are equipped with a paddle containing 50 bead-sized indentations. They scoop the paddle into the bowl, and it comes out containing 50 beads. The beads are hot, so workers cannot touch the beads or the container.

Jennifer, the manager of this simulated work process, had each worker dip the paddle once per "day." On the first day, she congratulated George for having only four defects and asked him to demonstrate his technique for Allen, who had the highest defect rate of the day. She gave Allen the benefit of the doubt by supposing that his poor performance was because he did not understand how to do his job. After George's demonstration, Jennifer encouraged all the workers to do their very best.

"Remember," she continued, "our goal is five or fewer defects per person. Our parent company's continuing investment in this plant—and hence, your very jobs—depends on achieving that level of quality." She believed that having a clear goal and knowing what was at stake in reaching it would ensure high performance from each worker.

At the end of the second day, Jennifer held a work team meeting to review results to that point. She expressed grave concern at Gloria's double-digit error rate and planned to meet with her privately to see whether Gloria was having problems at home that might account for this substantial loss of productivity. Gloria's home life had been fine, but that night her family could see her frustration and depression about work. Jennifer congratulated Carol on her consistency but noted that she needed to be consistently lower in defects. Carol promised to try harder, meanwhile trying to think what on earth she could do to score better next time. Jennifer congratulated Allen on his improvement and suggested that he practice his dipping technique at home that night.

Jennifer noted to the group that total defects had increased by 10, nearly one-third, with only Allen improving his score from the first day to the second. Hoping to reverse the downward trend for the others, she bought a series of large four-color posters on the importance of quality and hung them around the room.

Overnight, Jennifer had a further inspiration. At the beginning of the third day, she asked all the workers to stir the beads three extra times before dipping and to proclaim "Quality Is Great" just as they dipped their paddles. This approach seemed to be a promising combination of technical and motivational improvements. It worked! Her team recovered all the losses from the second day, returning to 32 total defects. She institutionalized these procedural improvements for future use and asked George to give a motivational lecture, "Three Is the Key." She had a private talk with Carol, noting that Carol was the only one to do worse than the previous day and questioning her ability to reach the five-or-fewer level.

That evening, supervisors from the parent company arrived to observe work in their new plant. They were not pleased with that day's work or with the plant's track record. They commended Jennifer on her innovative management techniques and wondered aloud whether they had chosen the right state for the plant, for workers seemed incapable of producing profitable results. Allen, who had become shop steward, questioned whether the work had been properly designed and noted that they received too many colored beads from their suppliers. The supervisors dismissed his comment, noting that the suppliers were all highly ranked in their fields and that engineers from Most Prestigious Technical University had designed the work. After a few more months with defect rates that were too high, they decided to close the plant.

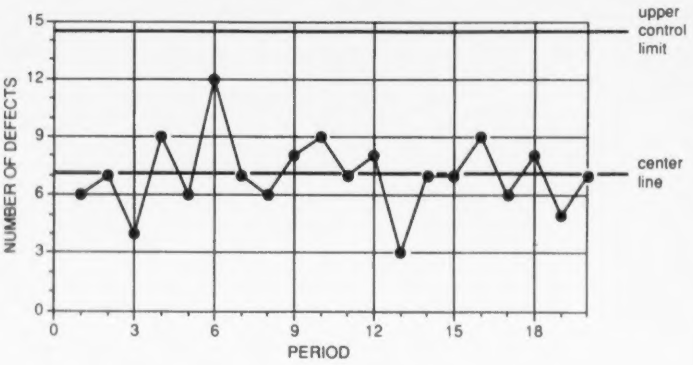
People who play the Bead Game soon recognize both its parallels with actual work situations—setting goals, trying hard, motivating, warning—and its hopelessness. Ultimately, the best and perhaps the only way to obtain lower defect rates is lowering the proportion of colored beads in the bowl. But the workers cannot lower the proportion, for they are dippers, not process designers, purchasers, or managers. The workers know that colored beads are the problem and where the colored beads are, but they cannot change the process.

Bead Game players, even those who immediately see its dynamics, often report high levels of frustration, unhappiness with their own inability to perform effectively, and anger at management's behavior. Even if they see that they can do nothing to improve their performance, they might feel as though they should be able to do better. Sometimes they cheat by double-dipping when they pull out a high number of colored beads. Sometimes they gang up against a worker with consistently poor performance.

These dynamics occur even among players with a good understanding of probability. The Bead Game is a probability game. Figure 10 is a control chart (an enhanced run chart as described previously), showing the number of defects for each worker each day, taken from table 4. As the calculations below the chart show, the workers made a total of 141 defects

FIGURE 10

CONTROL CHART FOR THE BEAD GAME



Sample proportion defective $= \bar{p} = \dfrac{\text{Number of defects}}{\text{Total number of tries}} = \dfrac{141}{1000} = .141$

Center Line = sample mean $= n\bar{p} = (50)\,(.141) = 7.05$

Upper control limit = sample mean + 3 × sample standard deviation

$= n\,\bar{p} + 3\sqrt{n\,\bar{p}\,(1 - \bar{p})} = 7.05 + 3\sqrt{50\,(.141)\,(1 - .141)} = 14.43$

Lower control limit = sample mean - 3 × sample standard deviation

$= n\,\bar{p} - 3\sqrt{n\,\bar{p}\,(1 - \bar{p})} = 7.05 + 3\sqrt{50\,(.141)\,(1 - .141)} = -0.3 = 0$

out of 1,000 beads dipped, for a defect rate of 14.1 percent. The average number of defects per worker per day was 7.05 out of 50 beads in the paddle.

By statistical calculation, the mean, plus or minus three standard deviations, gives a range of zero to 14.43 colored beads per paddle. This range can be understood as the "expected" distribution of defects. In other words, it is highly likely that all workers will dip from zero to 14 defects and highly unlikely that they will dip more than 14. Put yet another way, Jennifer should be surprised, impressed, or irate about an individual's performance only if it falls outside the expected range, as all other results are attributable to normal variations in the work process (common causes), not to individual behavior (special causes).

Jennifer could be depressed to realize that all her good ideas and exhortations of the workers could have no effect whatsoever on the results. This realization is the essential first step, however, toward understanding how administrators *can* help achieve better results. They must first change their typical first assumption that the worker is the problem when something goes wrong and must assume instead that the process needs to be improved. Only when a worker in the Bead Game scores more than 15 or less than zero (the former being extremely unlikely and the latter being impossible in this illustration) is it appropriate to focus attention on the worker. Administrators can improve the process by supporting the workers' efforts to find and identify ways to eliminate the colored beads and authorizing the changes that will make it possible to do so. This section describes some of the actions that administrators can take.

. . . defects are any variation in the output of a process that causes dissatisfaction among beneficiaries.

As you read this section, keep in mind that defects are any variation in the output of a process that causes dissatisfaction among beneficiaries. Furthermore, the colored beads represent not only defects but also, more important, any impediment that makes it difficult for people to perform their jobs well.

The processes in higher education organizations are far less obvious and their workings far less easy to assess than those of the Bead Game, which is why the technical tools and approaches described in the third section are so important: They illuminate the problems that arise from the way the organization operates. At least 94 percent of organizational problems are the result of the system, not the worker (Deming 1986, p. 315). Of the other 6 percent—problems that might be attributable to individual personnel—a substantial share is the result of normal variability or lack of adequate education and training for the position. Only a very small proportion of problems arises from recalcitrant or dishonest workers.

In other words, administration is responsible for nearly all organizational problems. First, administration created or authorized the systems and processes in which people work. Second, only administrators have the authority to change a malfunctioning system. Third, administrators assign workers to jobs, which carries the responsibility of ensuring a good fit between a worker's abilities and the job's requirements and of providing education as needed to enhance the fit.

Of course, individual administrators themselves operate within systems that are not of their own making and might be impossible for them to change on their own. Administrators as individuals are not to blame either. Each one in an organization must learn to change his or her reaction when something goes wrong. Rather than look for a culprit or a scapegoat, people must ask, "What is it about our processes that allowed this to happen?"

While the tools in the previous section address that question, effective use of the tools requires a supportive organizational climate and effective organizational leadership. The next subsection focuses on climate, for the organization needs an atmosphere of trust and cooperation and a supportive orientation toward its personnel. The subsection after that focuses on organizational leadership.

Creating a Supportive Organizational Climate

An organizational climate that supports each person's work is no mere pleasantry. A simple but hard-headed business reason makes such a climate necessary: An effective organization requires the best and smartest efforts of every one of its personnel. Anything less is waste, lost productivity. To elicit such efforts, leaders must free people from unnecessary bureaucracy and from fear to liberate their creative energies so that they can work together in service of the organization's goals. That such leadership also creates a pleasant work environment is a delightful side effect.

Teamwork and cooperation

The value of teamwork is well established in research, especially when a problem is complex and ambiguous, as in many organizational processes. Compared with individuals, including administrators, teams come up with more ideas and are better able to winnow them down to the best ideas. Moreover, teamwork helps people establish a shared sense of responsibility, reducing the amount of stress felt by any one person, allowing all team members to see how their work contributes to the whole, and building relationships among them that improve their work in other areas.

People working to improve quality must know how the process really works. Some of their knowledge comes from their own experience in part of the process, while other information comes from their research as a team. Moreover, their involvement in an improvement team gives them a personal stake in the outcome, increasing their motivation to solve a problem involving quality and allowing them to enjoy the fruits of their work.

When the team includes representatives of diverse roles, team members can knowledgeably discuss what happens at various steps and why. They can explain their needs as beneficiaries of preceding steps and ask those who work later in the process about their needs. The biology faculty member can explain to the purchasing agent why she needs a certain type of supply for her laboratory and ask why she so often receives the wrong type. The user of a laser printer can find out how to get transparency film that does not melt in the printer without having his purchase order "corrected" by someone in the purchasing office.

The barriers to teamwork include the department-oriented structure of postsecondary institutions, expectations of high status of faculty and administrators, expectations for short-term results, turnover among personnel, performance appraisal predicated on individual effort, and competitions to win resources. Such factors make it difficult to create a cooperative, team-oriented organizational climate. Continuously improving campuses will find themselves dealing with such factors, perhaps as explicit projects to improve quality using the technical tools from the previous section (see Scholtes et al. 1991 for a team-building resource guide for the TQM process).

Entrusting

The importance of entrusting personnel and teams cannot be underestimated. "Entrust," as used here, means that the administrator (1) cedes the authority to make recommended changes, (2) makes the recommended changes, or (3) in declining on rare occasion to make such changes, provides a complete, honest, timely explanation of the reasons for declining. Some people use the word "empower" in this sense, but we believe that individuals and teams have intrinsic power and that what they need from their supervisors is trust.

Everyone has experienced the frustration of offering an opinion or suggestion only to have it ignored. The more often it happens, the less likely one becomes to offer an opinion at all. Organizations practicing TQM cannot afford this withdrawal of involvement, and no organization can afford the alienation it causes. A primary role of administrators in TQM organizations is to authorize the changes that a quality improvement team recommends.

Administrators must still ask tough questions: "How do you know this will eliminate the problem? Will the solution harm our ability to control expenditures?" for example. When the team provides responsible answers, administrators must trust the recommendations. If they remain uneasy about the wisdom of a recommendation, administrators might authorize limited implementation using the PDCA cycle to see whether it works. Alternatively, they might make a conscious decision that the cost of a failed recommendation is less than the value of their demonstrating trust in the team and the potential learning value if it fails.

Education

Unfortunately, the circumstances under which people work often include lack of education and training. At its foundation, an organization is nothing more or less than a collection of people. The more knowledgeable and skilled each person is, the more effective the organization can be. Thus, continuously improving organizations invest heavily, as much as 5 percent of their total budgets, in a continuous program to train and educate personnel.

It is useful to distinguish between training and education. When people are trained, they learn how to do something. This step is essential, but it is not enough. When people are educated, they learn why. We need educated people to help us improve processes.

The only real expert about a given job—the only person who can improve job performance—is the person doing it. Yet people too often lack three critical ingredients for effective performance. First, they might have little or no information about how an organization wants them to perform this job or how their job fits into the organization. They have little sense of how their work makes a difference. Second, they might have had little or no education in how to make changes, alone or in collaboration with others, that can improve their work. Third, the organization might actually discourage them from improving their work, for example by making them fear reprisal if they reveal that they are experiencing a problem.

This third point merits elaboration because most administrators are unaware of the extent to which fear pervades their organizations. For example, junior faculty members might want to improve their teaching methods, but they might fear that admitting their desire for improvement will make the department chair or dean feel they are not doing a good job. Going to an instructional development office can be as intimidating as going to a personal counselor. Moreover, junior faculty could fear that if they devote time and energy to improving their teaching, they will jeopardize the research on which they believe decisions about promotion rest. A campus cashier who is unable to get the cash box to match the transaction records could fear reprisal and seek a cover-up. A custodian who sees an unexpected opportunity to do some preventive maintenance might fear the consequences of not completing the assigned tasks in the assigned time. Quite often—and in all parts of campus operations—people fear that improvements in productivity will make their jobs unnecessary, so they fail to identify ways in which they themselves could be more productive. Fear is a pervasive, powerful inhibitor of improvement; appropriate education and training can help reduce fear by reassuring people that the organization supports their efforts to improve. An important feature in administrators' in-service education is to examine the nature and extent of fear on campus, its impacts on productivity, and how its harmful effects can be eliminated.

Administration's job is to create an environment where people can work productively and effectively. Administrators must ensure adequate training and education. People cannot prevent error unless they know what constitutes error and how to avoid it. This statement is not as straightforward as it might seem, and it applies to every single person who works in the organization. For example, consider the clerk who processes requests for on-campus housing. Would the clerk be wrong to take extra time to help a student find off-campus housing or to deny housing to a student who is ineligible to stay on campus but cannot otherwise afford to attend school? Is the mission of the housing office to allocate scarce places to eligible students or to ensure that students can attend college with affordable housing?

Decision making

TQM is not the same as participatory management, although a high level of participation in decision making is essential to improve quality. TQM requires that every faculty and staff member not only have the responsibility to improve quality in their domain but also effectively share the authority to assume that responsibility. TQM does not, however, mandate that each person be able to act independently on all matters affecting his or her work. To the contrary, TQM highlights the interdependence of work and the importance of involving all affected parties in making improvements.

TQM does not make predetermined changes in the authority structure, nor does it change the need for a faculty governance system. It does, however, require that administrators understand and act upon one of their most important responsibilities: removing the barriers that prevent faculty and staff from achieving quality work. That is, an increasing proportion of administrative decisions should be those that make it easier for others to perform effectively. In many cases, such decisions require administrators to listen more closely and more often to what faculty and staff in their area say.

Administrators must also take conscious steps to delegate substantial authority to make improvements in one's own work or to deal expeditiously with the needs of a beneficiary. When front-line service providers like registration or fee-payment clerks have to tell a customer to wait while they check with a supervisor, the matter is a prime candidate for either a quality-improvement team or delegation of authority.

Personnel administration

Using TQM effectively depends heavily on having an effective personnel administration system (McLean, Damme, and Swanson 1990; Moss 1989). As personnel systems have evolved, they have often strayed from their fundamental purposes (see Byham and Cox 1988 for an unusual review of key principles in personnel administration). A personnel classification system that has become so involved in its own bureaucracy that it serves more to grant or deny organizational status than to support productive work is an example of such straying.

Most organizations using TQM have condensed many levels of organizational hierarchy to just a few. They did so because they found that the distinctions among the levels were not meaningful enough to warrant the ill feelings generated by perceived injustices. They also found that having fewer levels allowed all personnel to relate more constructively to one another, focusing on the work rather than on taking a small step on the career ladder.

Evaluation of personnel is also a central issue in TQM. The typical personnel evaluation system gravitates toward either perfunctory compliance or punitive case building toward dismissal. In the first case, it is a waste of time. In the second, it instills fear with no constructive benefits for the person evaluated. The typical personnel evaluation system also emphasizes individual effort, not teamwork, and it encompasses only one year at the most. The person gains no recognition for cooperation, for small improvements, or for thinking and acting in ways that position the organization better for the long term.

Moreover, some organizations use personnel evaluations to judge people relative to one another in giving salary increases—often to the point that one person's raise literally comes at the expense of a nearby colleague's. The toughened administrator might believe that such trade-offs are simply a fact of economic life, but an increasing number are beginning to limit their willingness to pay the price in lower morale. As budgets have grown increasingly tight, the cash difference between "good" and "excellent" performance has grown so small that it merely irritates both performers.

Many distinctions in performance can be likened to a lottery (Deming 1986, p. 274). In the language of the previous section, most performance is the result of common causes (the conditions and systems within which people work), not special causes (an individual's special attributes). Making numerous fine distinctions among individuals is rewarding common causes that seem to be associated with those individuals, not rewarding the individual.

Moreover, it is often difficult to match rewards and behaviors. The faculty member who published several fine articles in the year when the state had no money for raises but none in a later "catch-up funding" year has experienced this phenomenon. So has the unrecognized staff member whose small suggestion saved many hours of work. The admissions officer might have been penalized for not increasing the size of the entering class, when demographics and campus politics made it an impossible assignment.

Merit ratings might reward people who perform well in the system, but they could punish those who try to change the system (Deming 1986, p. 102). Because a central idea in TQM is that organizational processes desperately need changing to effect continuous improvements, merit ratings could actually work against improving quality. The process itself produces most performance "effects," as illustrated by the Bead Game.

Many personnel systems could be improved rather simply and dramatically. If appraisals of performance are desired, evaluations can focus on teamwork, values, initiative, cooperation, and effort (Scholtes 1987). These topics would substantially displace any current focus on quantity of output, refocusing instead on key components of improving quality. At Xerox, promotions among management depend on evaluations from those supervised with respect to leadership through quality ("leads, teaches, and coaches others to continuously improve work practices and business results"), human resources management, teamwork, and corporate values (Rittenhouse 1991).

People often respond well to nonsalary forms of reward and recognition, such as ceremonies, awards, lunches with senior officials, and other perquisites (*Briefings* 1989). Businesses using TQM have developed many such forms of recognition—more than those in colleges and universities might find comfortable. Yet we often provide plaques for years of service and honor our retirees. Perhaps we could find ways to show our appreciation not only for loyalty and endurance, but also for efforts to improve quality.

Issues of personnel administration are likely to become increasingly salient in postsecondary institutions' transformation to quality improvement. The unresolved questions in this area are numerous and difficult. The processes and tools in the previous section might provide a useful approach to resolving them, and the literature that could inform change is growing (see, for example, Graber, Breisch, and Breisch 1992; Lawler 1990; Liebmann 1992; McLean, Damme, and Swanson 1990; and Scholtes 1987).

Organizational Leadership

Changing organizational climate to be more supportive is a central challenge that requires leadership. Senior administrators and faculty must take responsibility for reexamining and changing incentives and structures. But these senior officials have additional responsibilities to maintain organizational focus.

Quality mission

Deming's first point (see table 1) is to "create constancy of purpose toward improvement of product and service." While commitment to improving quality is an hour-by-hour, decision-by-decision task, one important way to set the stage is through the adoption of a quality mission statement. Just as an organizational mission statement focuses everyone's attention on key purposes, the quality mission statement has the same value. Ideally, the organizational mission statement is also the quality mission statement. Historically, postsecondary missions have often inventoried program offerings with assertions of quality. Most, however, have yet to take explicit account of what beneficiaries need or to acknowledge the importance of continuous improvement in quality (Block 1987, chap. 4).

Perhaps the most important feature of a good quality mission statement is its meaning to the people in the organization. There is no "correct" format or content, but it should address several questions: What do we do? For whom do we do it? Why do we do it? How do we do it? The following good examples also contain statements of values and guiding principles that are not fully reproduced here:

University of Michigan. The first draft of a new quality-oriented mission and vision for the University of Michigan states in part:

> ***Mission:*** *To serve the people of Michigan and the world through preeminence in creating, communicating, preserving, and applying knowledge and academic values, and in developing leaders and citizens who challenge the present and enrich the future.*
>
> ***Vision:***
>
> - *To be a source of pride for the people of Michigan.*
> - *To have a place in the dreams of every potential student and faculty member.*
> - *To have a place in the heart of every member of the University community.*
> - *To have an international image as a community that honors human diversity—and a reality to match the image.*

- *To be a community of scholars in which ideas challenged by people are welcomed and nurtured* (*Michigan Today* 1991).

University of Wyoming Division of Administration and Finance. The mission of the Division of Administration and Finance at the University of Wyoming is "to provide, manage, and continuously improve business operations and related services to effectively support the mission of the University."

- *We believe in the value of higher education and that the Division is a partner in the educational process.*
- *PEOPLE are the source of our strength. We value and respect each other's diversity and contributions. We will prosper only through our individual and collective growth and development.*
- *Our INTEGRITY will never be compromised.*
- *We value EXCELLENCE. Our pride and our future depend on the satisfaction of those we serve. We strive to CONTINUALLY IMPROVE THE QUALITY of the products and services we provide.*

City of Madison Police Department. "We believe in the DIGNITY and WORTH of ALL PEOPLE. We are committed to:"

- *providing high quality, community-oriented police services with sensitivity*
- *protecting constitutional rights*
- *teamwork*
- *openness*
- *planning for the future*
- *providing leadership to the police profession.*

Principles of Quality Leadership:

1. *Believe in, foster, and support TEAMWORK.*
2. *Be committed to the PROBLEM-SOLVING process: use it and let DATA, not emotion, drive decisions.*
3. *Seek employees' INPUT before you make key decisions.*
4. *Believe that the best way to improve the quality of work or service is to ASK and LISTEN to employees who are doing the work.*

5. *Strive to develop mutual RESPECT and TRUST among employees.*
6. *Have a CUSTOMER orientation and focus toward employees and citizens.*
7. *Manage on the BEHAVIOR of 95 percent of employees and not on the 5 percent who cause problems.*
8. *Examine PROCESSES before placing individual responsibility when problems arise.*
9. *Avoid "top-down," POWER-ORIENTED decision making whenever possible.*
10. *Encourage CREATIVITY through RISK TAKING and be tolerant of honest MISTAKES.*
11. *Be a FACILITATOR and COACH. Develop an OPEN atmosphere that encourages providing and accepting FEEDBACK.*
12. *With teamwork, develop with employees agreed-upon GOALS and a PLAN to achieve them.*

Fox Valley Technical College. "The mission of Fox Valley Technical College is to promote the attitude of education as lifelong learning. The college will provide quality educational experiences to prepare students for entry-level and continued employment that meets their needs and the needs of the community . . . [served]. To meet the needs of the changing workplace, the college will provide a flexible, dynamic approach to education that will assist in building a community that is economically strong and competitive."

Motorola, Inc. "Dedication to quality is a way of life at our company, so much [so] that it goes far beyond rhetorical slogans. Our ongoing program of continued improvement reaches out for change, refinement, and even revolution in our pursuit of quality."

Planning and goal setting

TQM encompasses a number of tools to help leaders make strategic decisions. The following material deals with some of the tools that senior administrators might use, but it makes no attempt to be comprehensive.

Benchmarking is a way of setting objectives—comparing products, services, and processes against the very best, seeking to learn from their practice and ultimately to outperform them

Benchmarking *is a way of setting objectives—comparing products, services, and processes against the very best, seeking to learn from their practice and ultimately to outperform them.*

(Camp 1989; Lareau 1991, chap. 12). Having satisfied beneficiaries is not enough. If another organization can do the job better (higher quality, lower cost, or both), then sooner or later your beneficiaries will become dissatisfied. This approach contrasts sharply with typical practice in postsecondary education, where we often compare ourselves to our peers. Our peers are usually chosen for their similarity to our type of organization, not on the basis of a specific service or result, such as registering for courses or the satisfaction of electrical engineering alumni. We usually compare ourselves to the average—or the best-funded—of our peers, not often to the best. Our peers are always other postsecondary institutions; benchmarks might be in any field.

Benchmarking is important both conceptually and practically. It allows you to interpret how well you are doing by comparing your R criteria with that of the benchmark organization and to improve by studying their process and P criteria. Benchmarking sets high expectations for performance based on what someone else is really able to achieve. A goal of 99.5 percent enrollment in first-choice courses is not a target plucked from the air but a fact in another college. TQM organizations aim to set benchmarks themselves, and they are pleased to share information with others on how they achieved it. Thus, benchmarking promotes interorganizational cooperation and dramatically reduces time on the learning curve for aspiring organizations. The people who set the benchmark are motivated by both pride in their achievement and the realization that someone else could overtake them if they rest on it. The people who aspire to the benchmark are motivated by seeing that achieving their goal is feasible and how they might adapt the other group's practices to improve their own processes.

The first step in benchmarking is to identify the process to be improved, such as student registration, fee payment, billing, purchasing, recruiting, supporting the work of part-time faculty, or student placement services. The second is to define appropriate performance indicators for that process, collect your own data on those indicators, and search for the best performers elsewhere on those indicators. Although some processes might be distinctive in postsecondary institutions, many are not. A community college successfully benchmarked its student registration process against an airline reservations system, for example. L.L. Bean catalog company is well known for its sophistication in maintaining and using mailing lists, a function that admissions and alumni offices share. A campus security force might look for benchmarks in the police department in Madison, Wisconsin, which has been working continuously to improve for many years.

The campus will then compare its performance data against those of its benchmark organization to determine the gap and set a target for improvement. The campus works with the benchmark organization to understand its process and uses that information to help determine methods of improving its own. Ultimately, any and all processes are candidates for benchmarking, and benchmarking can become a standard part of the PDCA cycle (Berger 1991).

TQM organizations need to plan, and different approaches to planning are available (see, for example, Gitlow and Process Management 1990; Juran 1988). *Hoshin planning,* also called *policy deployment,* is equivalent to strategic planning but with a strong emphasis on deploying the strategy throughout the organization. Rather than being the sole province of the top administrators or an intellectual exercise that has little organizational impact, Hoshin planning pushes planning throughout the organization. It encompasses the following steps:

1. Establish organizational vision, typically for up to five years.
2. Develop three- to five-year objectives.
3. Develop annual objectives.
4. Deploy the objectives to departments to develop plans.
5. Implement plans.
6. Review progress monthly and quarterly.
7. Establish an annual review (GOAL/QPC 1989; King 1989).

These steps are clearly similar to those in any rational planning process. Each step, however, has a variety of activities that come from the perspective of TQM and aim to foster individual initiative and alignment among the efforts of all. Hoshin planning focuses on process and root causes, and it requires extensive, continuous horizontal and vertical communication.

Quality function deployment is another tool, one that focuses on either developing a new product or service or improving an existing one (Bossert 1991). Through a comprehensive matrix supported by research and data, the organization designs a new or revised product or service that is rooted in the requirements of its intended beneficiaries. The process of quality function deployment results in a product or service that meets the beneficiaries' most important needs, recognizing the possibility that it might be unable to meet *all* their needs. It helps the organization recognize whether it can adapt existing methods for meeting their needs or whether it requires an entirely new approach.

Administrative problem-solving tools

In addition to the approaches to leadership just listed, Total Quality Management provides tools for administrators to use when dealing with complex ideas and interrelationships or with processes that occur too infrequently to generate the data for a quantitative analysis.

A comprehensive, practical overview of some management tools is listed in table 5 (Brassard 1989). The tools are particularly helpful for middle and upper administrators who often must organize and deal with verbal rather than quantitative data. A problem-solving team uses the tools to organize ideas in ways that support better decisions or organize efforts at improvement. In general, the tools take their input from the team's brainstorming and expertise, after which the tools provide structured ways to organize, analyze, and act on that input. The tools are useful in various stages of Hoshin planning, quality function deployment, benchmarking, and other administrative functions.

The affinity diagram and interrelational digraph are especially helpful in the initial stage of problem solving. The affinity diagram is a creative process to identify categories of broad issues, while the interrelational digraph is a logical process to identify root causes. Both tools permit the team to move from a large number of ideas or issues to a manageable number of key ideas or issues.

Working on those key ideas, the tree diagram breaks them down into ever-greater detail for implementation. Priority matrices compare options based on known criteria. A matrix diagram can help assign people or groups to carry out tasks for implementation. When such tasks are unfamiliar, the process decision program chart can help the group plan for unforeseen contingencies. The activity network diagram provides for scheduling and monitoring tasks for implementation.

TABLE 5

SEVEN MANAGEMENT AND PLANNING TOOLS

Tools	**Use**
Interrelational digraph	To graphically map out the cause and effect links among all items generated by brainstorming.
Affinity diagram	To find the major themes out of a large number of ideas, opinions, or issues.
Tree diagram	To systematically map out in increasing detail the full range of paths and tasks to achieve a primary goal and its subgoals.
Priority matrix	To prioritize tasks, issues, or options based on known weighted criteria.
Matrix diagram	To organize two or more sets of ideas or issues by showing their logical connecting points.
Process decision program chart	To map out conceivable events and contingencies in any implementation plan and countermeasures to them.
Activity network diagram	To plan a schedule for completing any complex task and its subtasks.

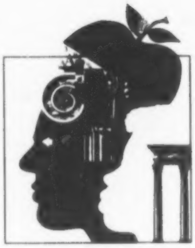
Source: Brassard 1989.

Summarizing the Administrative System To Improve Quality

Just as TQM is not the technical tools described in the previous section, it also is not the administrative concepts and tools in this section. Once again, TQM is a comprehensive way of living and working in organizations. This section has discussed some of the fundamental perspectives that characterize the administration of a TQM organization:

1. The primary job of administration is to remove the barriers that prevent people from achieving quality work processes. They cannot do that job without seeking, listening to, and responding to what these people have to say.

2. When something goes wrong, the most appropriate and productive first assumption is that the process needs improvement. Making this assumption requires changing the habit of blaming the person who is working in the process.
3. The most valuable knowledge about how to improve a process resides in the people who work in the process. Reaching this knowledge requires a supportive climate in which people are free of fear. Taking full advantage of it requires cross-functional teams of people who work at various stages in the process.



4. Cooperation must replace competition as the organization's operating premise. Colleges and universities, like other organizations in this country, tend to cultivate competition in more ways than they realize. Supporting cooperation will require many substantive changes.
5. Administrators must entrust the people who work in a process with the opportunity and the authority to improve it.
6. People cannot prevent error unless they know what constitutes error and how to avoid it. The value of education and training for all cannot be overestimated. Colleges and universities need to support the educational needs of their faculty, staff, and administrators, as well as their students.
7. Evaluation systems for personnel and performance must support cooperation, initiative, and continuous improvement. Most do not do so now. They need to include attention to nonsalary recognition, reward, and celebration in ways that fit each campus culture. They must not induce fear.
8. Leadership can enhance shared values and commitment to quality by developing, espousing, and living up to a quality mission for the organization.
9. Benchmarking to identify and learn from excellent processes in other organizations helps motivate and inform continuous improvement.
10. TQM offers an array of leadership planning tools, including Hoshin planning and quality function deployment. It also offers an array of problem-solving tools for dealing with nonquantitative issues. Like the quantitative tools listed earlier, the underlying concepts are often more important than the techniques themselves.

> *Our system of higher education is one of this country's most powerful competitive weapons. Working together, companies and institutions of higher education* must *accelerate the application of total quality management on our campuses if our education system and economy are to maintain and enhance their global positions* (Robinson et al. 1991, p. 95).

The men quoted above are the current or former chief executive officers of American Express, IBM, Procter & Gamble, Ford, Motorola, and Xerox. Their companies have been sponsoring an annual invitational Total Quality Forum for university presidents and deans of engineering and business since 1989 to persuade them to teach TQM in engineering and business. With great tact, the companies are saying, "We are your customers. We need TQM-oriented graduates for our entry-level positions. We need TQM-focused research. You are not meeting our needs." One executive speculated in hallway conversation, "We'll probably have this forum for another year or two. After that, we'll stop recruiting in places that are not teaching Total Quality, no matter how prestigious the university might be."

The third forum, held in 1991, included a panel that addressed for the first time the possible desirability of making the commitment to quality throughout the campus. Even if university personnel could find ways to use TQM in such a different kind of organization, the corporate sponsors had not wanted to intrude that far on a university's operations or prerogatives. It proved to be the highest-rated session of all, with business and engineering faculty who taught TQM becoming increasingly vocal in their opinion that "we cannot teach this unless we are using it." That they are not yet using it was shown as recently as October 1991, when the *Wall Street Journal* reported that business school executive programs were finally beginning to respond to corporate needs for custom courses (Fuchsberg 1991). These programs had previously insisted that corporate students attend generic executive courses or create their own corporate education programs internally.

The faculty who called for the use of TQM in their university did not limit their statements to "the administrative side of the university," which is what most campuses committing to quality have done thus far (Seymour 1991). Faculty members from highly visible schools of business and engineering began by offering TQM courses but soon found themselves using TQM principles to improve their courses, their curricula, and their academic support functions. It is these faculty—and those who subsequently join their ranks—who will define and develop the idea of continuous improvement in academic quality. Records of their work to date are few and fugitive, so this section consists primarily of our current speculation.

A Thorny Issue: Student as Beneficiary?

The first barrier many faculty encounter in thinking about TQM for academic life is their reluctance to consider the student as the beneficiary of the educational process. They might see the student as an input to the process—"the vessel I try to fill with knowledge." They might see students as outputs when they graduate. Students might even be considered coworkers in the system. Indeed, students are all these things. But some faculty cannot see the student as someone who can competently express his or her educational needs and justifiably insist that those needs be met. With the increasing number of returning adult students, often with substantial life experiences and specific educational objectives, this faculty perspective is becoming increasingly unjustified.

A faculty member at the University of Wisconsin resolved the dilemma by defining students as beneficiaries of the teaching process, but not its content (Hau 1991). The instructor created a small team in each of his classes, working with students to define needed improvements in such areas as the clarity of the transparencies and the utility of the computing manual. He retained the authority to make decisions about what to teach and what teaching methods to use.

Another faculty member sees his beneficiaries in generations: current students, faculty in follow-up courses, employers, and society (Zahn 1992). One might add alumni to the list, thinking about what benefits a current student will need five, ten, or more years in the future, and also the faculty member's disciplinary colleagues. We have found that faculty generally resonate well to the idea that faculty teaching subsequent courses are their beneficiaries, and it is a productive starting point.

Without necessarily connecting it to TQM, other faculty have similar views. The Harvard Assessment Seminars were based on the key principle that findings must improve students' learning, and they involved students at every step (Light 1990, 1992; Marchese 1990). The long-standing approach of Alverno College to developing "abilities that last a lifetime" makes students active partners in learning.

In addition, it is common practice to ask students to evaluate the process of instruction and sometimes the content in end-of-term questionnaires. The increasing interest in classroom research (Cross 1989; Cross and Angelo 1988) is a promising extension of this practice. For example, in "minute papers," students spend a minute at the end of a class to write anonymous answers to "What was today's major point? What remains unclear to you?" The professor uses their replies to adjust instruction as needed to ensure their comprehension of key material. Although the acceptance, nature, and uses of evaluation by students vary widely among campuses and among professors, our enterprise does have a history of accepting the competency of students to speak as beneficiaries.

Faculty might find it useful to consider the analogy of a medical patient. Physicians once tended to think and speak of patients as "cases." Mrs. Jones was "the appendectomy," Mr. Smith "the broken leg." Excluding the stereotypical country doctor, nonemergency patients saw the doctor at the latter's convenience, took whatever information the doctor happened to offer, and did as they were told. Today, physicians, clinics, and hospitals advertise for business. They offer extended clinic hours. They try harder to treat the patient as a whole person with complex interacting parts and a need for information. When faculty are patients, they expect to be treated as intelligent beings with sound information to provide on their history and symptoms and legitimate demands for full explanations about their alternative options and risks.

Yet those very faculty might insist on teaching at hours of their own convenience, using teaching methods that are comfortable for them. They might treat students as people who know nothing until they know what the faculty member wants them to know. They might regard their students' failure rate as one indication of the quality of their instruction. They might provide little orientation regarding why they include certain materials, how the course fits into the curriculum, or how the student will benefit from mastering the material. They might be surprised to learn that their alumni must routinely take special courses to learn material not covered in the curriculum or that the employers of their graduates are beginning to look elsewhere for new employees.

One potentially helpful approach is to think of students as "partners" in the learning enterprise. Like a business partner, students have some valuable contributions to make, the nature of which could differ from student to student. A successful joint venture requires understanding your mutual goals, capitalizing on the partner's assets, and adjusting to accommodate your partner's liabilities. It requires communication among partners, with mutual respect. The student *is* a beneficiary of the education process, and the process cannot be effective unless the faculty member understands the student's needs. Fortunately, students can articulate many of those needs. Unfortunately, we tend not to take their views into account as one of several important sources of information.

Using Total Quality to Improve the Curriculum

The primary beneficiaries of instruction are the students, now and in their future lives. What if we expanded the limited research that explicates how students understand quality in their educational experience? (See, for example, Feldman 1988; Litten and Hall 1989; Moffatt 1991.) What if we involved students actively in the process of improving instruction?

What happens when we conceive of education as a process, taking the student's point of view? Try a flow chart of one student moving through the curriculum over time. Many people have observed a great gap between the published curriculum and the "real" curriculum as represented in students' transcripts. What do we see if we track the "real" curriculum on a flow chart? Does it need improvement?

Do opportunities exist to streamline the process by eliminating unnecessary complexity? Does the process hold any scrap or rework, such as remedial courses or remediation within courses? Could some things be done faster and/or better through alternative instructional modes, including instructional technology? An introductory philosophy class at Stanford, highly popular for many years, is based almost entirely on computer-based individualized instruction for classes of 100 to 200 students.

What happens when we take the perspective that the departments, or the course sequences within departments, are beneficiaries of each other? Does the math class provide the necessary foundation for the major?

Especially for vocational and professional curricula, does the instruction provided meet the needs of the subsequent employer of the graduates? Are the alumni satisfied? What if we take the view that the student later in life, or society at large, is the beneficiary? Are we providing what is needed for a rich life and a viable society?

Using Total Quality Management to Improve the Classroom

To what extent do faculty exhibit a restless determination to continuously improve their own courses? Do they have the tools to do so? Do they operate in an environment that is free of fear? Do they conduct experiments on effective ways to convey different kinds of material? How knowledgeable are they about variations in students' learning styles, and do they accommodate such variations?

A substantial amount of research exists on effective instruction (see Pascarella and Terenzini 1991), with one of the most robust findings being the importance of students' involvement in learning. Are faculty well aware of what is known about effective instruction? To what extent do their teaching methods involve students in learning?

As employers in virtually all fields are moving rapidly into Total Quality Management, it is increasingly important that all graduates have certain skills, knowledge, and abilities that are functional in an environment using TQM. This idea underscores the importance of current movements toward ensuring critical thinking skills. It could also argue for cooperative learning and other strategies to develop skills in cooperation, group processes, and communication.

To what extent do faculty exhibit a restless determination to continuously improve their own courses?

Assessment and Total Quality

Before the 1980s, those in postsecondary education stressed inputs to the virtual exclusion of all other indicators of quality. The assessment movement of the 1980s was a reaction to increasing doubt about the quality of output of higher education. The public and major funding sources were no longer impressed by inputs, and they demanded demonstrable results.

As pioneers in assessment came to grips with these demands, they developed the idea that assessment should serve two purposes: Assessment should show that colleges and universities are achieving their intended outputs (the accountability function), and it should provide information that permits faculty and administrators to improve what they do (the improvement function). A useful analogy for these two functions is the difference between the thermometer and the thermostat. The thermometer (the accountability function) displays the temperature; the thermostat (the improvement function), in conjunction with appropriate support systems, produces the desired temperature.

Early approaches to assessment were far more oriented toward accountability than toward showing the people in the process how to achieve better results (Ewell 1991). They were far more concerned with ensuring multiple and authentic assessments with the greatest possible capacity to represent important outcomes effectively than they were with helping to prevent problems during the course of each student's education.

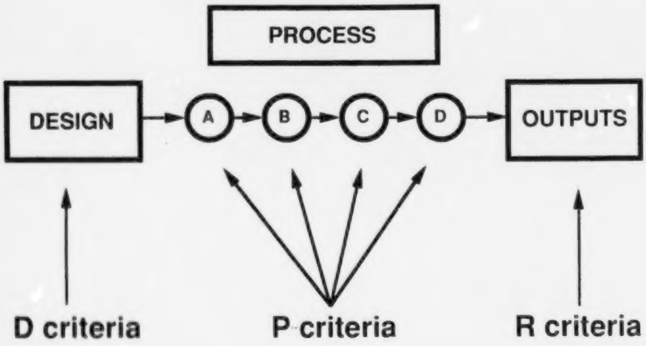
Recognizing this difficulty, proponents of assessment began to call insistently for campuses to *use* the results of assessment. Their advice focused on feedback of results and on planning for change. They underestimated the importance of taking into account from the outset the need to identify where, how, and what kind of improvements might be required. They focused instead on trying to "inspect quality into education at the end of the line." That is, assessments occurred only at the end of the year, at the end of general education courses, or at the end of major courses. TQM offers an alternative, more effective approach: Ensure quality at every step in the process.

To illustrate the difference, figure 11 is a modified version of figure 5. What is commonly known in higher education as "outcomes assessment" falls in the category of R (results) criteria. To use outcomes assessment to improve instruction would be to take indicators of defectiveness among students and try to determine what it was about the process that needed correction. Too often, assessments that focus on students rather than the learning process (classes, courses, curricula) are incapable of identifying flaws in the process. They are much better at identifying flaws among students.

Instead, faculty need to have clearly identified the knowledge, skills, and attitudes they require at the end of a course or upon completion of general education or the major, and

FIGURE 11

IMPROVEMENT VERSUS ASSESSMENT



Continuous Improvement	Inspection
	Assessment
Preventing defects	Detecting defects
What to do with the process (learning)	What to do with the product (students)

to have traced carefully through the courses and curricula to identify when and where students are expected to learn that knowledge, skill, or attitude. In other words, they need to understand how the process must work to achieve the expected results. With that understanding, they are then in a position to apply D and P criteria throughout the process to see what is or is not working as expected. With numerous and diverse process criteria, they can identify problems almost immediately. Through the PDCA cycle, they can collect data on the problems and change the process to prevent them. Although the challenges involved in this approach are considerable, the potential result is an educational process that works.

To a certain extent, the standard practice of giving quizzes, tests, and final examinations represents process-based assessment. The focus in these activities, however, is to test the *student*. TQM suggests that we also actively use tests of *instruction* and *learning*. We might try to determine, for example, whether the lecture is an effective way to help students learn this point. Do we need to use diverse instructional modes to accommodate students' different learning styles? Before we go on to the next concept, do we know that students have mastered its predecessor? When we add up the courses that students actually take, have they learned what they need to know?

The Seventh Annual AAHE Assessment Conference in 1992 included, for the first time, sessions on TQM. The occasion was the first opportunity for proponents of both assessment and TQM to discuss their views. The general consensus was that the assessment movement had evolved to the point that leading-edge practices were fully consistent with a philosophy of continuous improvement and that the philosophy (1) provides directions for further enhancement of assessment practices and (2) can establish an organizational context that will support the goals of assessment. Because assessment is indigenous to higher education, having evolved over many years through faculty leadership, its convergence with TQM lends substantial credibility to the theory that TQM is not only appropriate for higher education but also valuable.

Some of the observations by proponents of assessment at the conference show how TQM contributed to their thinking. One said that assessment is iterative, while TQM is continuous. Another noted that both process and outcomes are important to both views, but TQM shifts the emphasis to process. Moreover, teaching and learning are both important, but TQM shifts the emphasis to learning. Several liked the idea of focusing on the fact that learning occurs one student at a time: What is important is not that the faculty own teaching and the curriculum but that students own learning and faculty are, in a sense, the trustees of students' learning. One theorized that the focus on accountability will shift from summative statistics (average scores on a test) to rates-of-change statistics (percent of improvement over time). Another said that learning about TQM helped him realize that "assessment is not an end in itself—rather a step in the journey to improvement of the entire delivery system."

In the end, proponents of assessment who believe in continuous improvement could find themselves changing not only their practice but also their language. Perhaps the "assessment movement" would be more aptly thought of as the "quality movement" or, even better, the "improvement initiative" to complete the evolution away from an outcomes-oriented, testing-driven concept. From an academic point of view, we might focus on Continuous Learning Improvement.

Toward a Seamless Web of Education

From the student's vantage point with education viewed as a process, education clearly does not begin at grade 13. The elementary/secondary system produces results that become postsecondary inputs. Postsecondary education is thus the beneficiary of elementary and secondary education. Does the latter system meet our needs? What are our needs? Furthermore, how do our needs differ from one campus to another? Does each campus know its needs and communicate them to prospective students and to the secondary schools from which it takes most of its students?

Throughout the following discussion, it is important to remember that inputs are not part of the definition of quality. As discussed in the second section, inputs can be only appropriate or inappropriate, proper or improper for the design and processes that create the outputs beneficiaries need. Thus, the point of this discussion is most emphatically not that all college-bound students must achieve top scores on standardized entrance examinations. To the contrary, different campuses meet different kinds of needs for different kinds of beneficiaries. Rather than preparing all young people for entry to an elite research university, the aim should be to develop substantially more sophisticated, more systematic understanding of the differing needs of young people and the differing missions and needs of colleges, and then to use that understanding to yield an effective match between matriculants and colleges.

We could think first of requirements for admission as a statement of our needs. Many campuses require only a high school diploma. Many others require only a minimum grade point average, class rank, or standardized test score. Of all these requirements, only the standardized test score provides the slightest information about material the student has mastered. Even in that case, we normally look only at the composite score. We might use subscores to assist in placement in a college course, or we might not. Even if admissions officers know a particular high school and its course contents well, such that a grade point average from one school has more or less weight than another in the decision about admission, this information is not normally used systematically to ensure a smooth transition for each student, subject by subject, from high school classes to selection of college courses.

If we were to adopt seriously the process view of education, we might move more fully toward admission requirements that define the high school courses required for success in a given college, perhaps even with some variation by intended college major. We might begin to work with the high schools on defining specific knowledge, skills, and attitudes that courses should emphasize for preparation for college. We might go beyond course content and discuss with the high schools the need to develop adequate study habits and inquiry skills.

"Supplier quality" is an important concept in TQM. Total Quality organizations feel a fundamental obligation to work with their suppliers to ensure appropriate inputs. They become partners with their suppliers; they are proactive in helping suppliers know and respond to the organization's needs. They aim to prevent defects from their suppliers just as vigorously as they do so in their own processes.

As an example of preventing defects, the state of Ohio recently began offering the college mathematics placement test to students who are still in high school. The feedback to students, teachers, and parents about how the student fared on the test is used to identify high school mathematics classes the student should take to prepare for college. This example is a good one of a P criterion measure. The information is provided at a time when the individual and the parents can make a process adjustment to *prevent* rather than remedy deficiencies in mathematics preparation.

A growing number of campuses are beginning to take advantage of programs from national testing organizations that also provide feedback for improvement. The testing organizations combine data from the student's entrance examination with data from the college about the student's grades as a college freshman and provide reports to high schools on how their students fared as freshmen. While this approach is not as proactive as that in Ohio, it does help high schools to evaluate the strength of their curricula and to advise students about which courses to take.

Achieving a seamless web of education requires recognizing that many colleges are also suppliers to elementary and secondary education systems in that they prepare teachers and administrators for those systems. School systems are our beneficiaries in that respect, and we have an obligation to understand their needs. Recent major reform movements have encouraged colleges to listen more attentively to school people and better understand their needs. An approach using TQM underscores the importance of such initiatives.

Teacher preparation colleges that do not move in that direction could soon find themselves in the same kind of difficulty as the business and engineering colleges that ignore the calls for TQM from business described at the beginning of this section. It appears that elementary and secondary education has moved farther and faster than postsecondary education toward continuous improvement in quality (*School Administrator* 1991; Snyder, Anderson, and Johnson 1992). The schools are increasingly likely to expect teacher preparation programs to meet their needs (not just for "good graduates," but also for more precisely defined knowledge, skills, and attitudes), or, eventually, they will hire their personnel from more responsive programs. Education in Total Quality Management per se could well be among their expectations.

Faculty Issues

In many ways, faculty are fully prepared to endorse and develop the concepts of TQM for academic applications. The very idea of quality is central to their culture; faculty need no persuasion that quality is important. Faculty expect that their campus will operate in a way that allows them to take pride in their work, and they are neither shy nor inarticulate about expressing their needs. Those who have tenure are not inhibited by fear of reprisal. Many faculty take enormous personal satisfaction in meeting the needs of their students. The faculty governance process is a manifestation of organizational trust in the faculty's ability and authority to make vitally important decisions that affect their work.

But the evolution of academic TQM is likely to be slow and difficult because of some common problems in academic culture and practice. Faculty tend to identify most closely with their disciplines, which can subordinate their interest in the total educational process as students experience it. The orientation toward discipline strengthens departmental boundaries and inhibits interest in cross-functional or cross-departmental issues. It also directs their choices about curriculum in ways that might or might not fully satisfy students' needs. Faculty might call upon their academic freedom to make independent decisions about what to teach as a defense against taking students' needs into account.

Faculty are first and foremost experts in their discipline. They might or might not be experts in teaching and learning, and the campus might or might not support their efforts to improve in that area through instructional development programs and incentive structures. They might or might not regard academic and student support functions as activities that merit their personal involvement beyond complaining when they are inconvenienced. The culture of authority through expertise could inhibit their willingness to listen to or work closely with those they see as having lower status in the organization.

Faculty function largely as independent entrepreneurs. Where research is important, they rise or fall on their own initiatives, not by volunteering for organizational quality-improvement teams. Except for some scientists, many faculty have virtually no experience with teamwork. They might see organizational service as an imposition on their time.

On many campuses, all faculty have obligations for teaching, research, and service. Although some are beginning to experiment with allowing faculty to define and revise their mix of teaching and research ("Plan to Change" 1991), standard practice allows little latitude for faculty to choose one of them as their dominant contribution. The promotion system often places greater value, explicitly or implicitly, on research. The incentives could be such that even faculty who value teaching above all might attend first to research.

The promotion and evaluation systems could rely primarily on students' evaluations as indications of the quality of teaching, and the academic culture might prohibit other forms of reviewing and improving instruction. Indeed, the promotion and evaluation systems might emphasize quality of the output rather than quality of the process, just as assessment might have been oriented toward accountability to the detriment of improvement. Thus, the very idea of continuously improving one's teaching, research, or service can be foreign to the organization's culture.

Despite all these difficulties, we believe that a preponderance of faculty have the attitudes, abilities, and authority to make changes that would encourage them to continuously improve academic quality in teaching, research, and service. They dedicate their professional lives to academic quality. They decide curricular issues, and theirs is the crucial contribution to defining and implementing faculty incentive structures.

Other Ideas for Improving Academic Quality

Teach TQM

The University of Chicago MBA program includes six courses on Total Quality Management. Fordham University offers a special Deming Scholars MBA program. Many industrial engineering programs teach TQM-related material, such as statistical process control. Program areas that seem especially relevant for TQM material include business, engineering, communications, and statistics.

Do research on TQM

Many major American businesses are pleading for academic involvement in evaluating their TQM activities. It might be most appropriate for faculty in the fields that teach it, such as those listed in the previous paragraph.

Use approaches involving TQM to improve academic research

The potential gains of this idea might be smaller than those for instruction and service, but they merit exploration, especially for applied research. Who are the beneficiaries of a given research project? What are their needs?

Use approaches involving TQM to improve academic service

In the case of service to the institution, taking the approach of Total Quality Management suggests some purposes and tools that can improve the functioning of traditional committees. One possibility is to be more proactive in creating cross-functional committees whose members represent various phases of the process under consideration (such as retention, academic advising, or orientation). More attention to defining the actual or potential beneficiaries for such service and their needs could be useful.

Use TQM to improve academic support functions

Total Quality Management provides directly relevant and useful approaches and tools to address student services, academic advising, course scheduling, registration, duplicating materials, allocating instructional equipment, student retention, and other academic support functions. Some academic support functions are assigned to administrative departments, while others operate through the offices of academic deans and department chairs. Deans and department chairs also participate in other administrative processes that are well suited to quality improvement, including budgeting, purchasing, traveling, and personnel administration.

Some important academic support areas that could benefit from TQM include transfer of credit, cheating, and cultural diversity. What proportion of transfer credits meet the requirements of the receiving institution and program? What are the root causes of any lost credits? How much cheating occurs, and why do students cheat? We typically treat cheating as if it had a special cause (the cheating student), but does cheating have common causes that are inherent in the academic process? How can the causes of cheating be eliminated? How do students from diverse backgrounds feel about their campus experiences? What aspects help them feel more or less comfortable, be more or less successful? How can the former aspects be enhanced and the latter removed?

Beneficial results have been reported in the academic support area (Cornesky et al. 1991). Process-improvement teams identified "negative attitudes toward students," "poor ratings of faculty," and "not enough general education sections" as key issues. Among other interesting activities, these teams placed cause-and-effect diagrams on bulletin boards, encouraging students, staff, and faculty to add their ideas about possible causes of these problems.

The applications of quality improvement to academic libraries are especially obvious in that libraries already recognize their service roles and the legitimacy of input from their constituencies. For example, libraries can improve their acquisitions processes, circulation, reference services, and cataloging through TQM. They can capitalize on data relating to time required to fill a patron's request, patterns in the use of materials, or surveys on patrons' views of library services.

Summary

At this stage of development, the faculty will play the most important role in developing the concept of continuous quality improvement and other ideas involving TQM as they might apply to academic activity. Many of these ideas have roots in current practice, but they are not fully or consistently applied, including the central role of quality in academic life, the fact that learning itself (our central function) is by definition continuous improvement, and the fact our faculty are expert at using the scientific method, which is analogous to a data-driven PDCA cycle.

Alienation will occur if TQM is seen as another management fad from the evil empires of business, if administrators commit to quality primarily as a cost-cutting strategy. . . .

Nevertheless, several vitally important questions need resolution by faculty. To what extent and in what ways are faculty comfortable treating students as beneficiaries, with all that it implies from the point of view of TQM? Is it feasible and useful to emphasize quality improvement and a process orientation in assessment rather than accountability and an orientation toward outcomes? What would be the implications of relaxing departmental boundaries in favor of structures that encourage more serious examination of the multidisciplinary process of education as students experience it? Can and should faculty incentive systems become more responsive to faculty efforts to improve instruction?

Whether TQM moves fully into the academic arena will depend on faculty members' deliberations on such issues. Their willingness to tackle them might well depend on how they learn about TQM, especially as their campus administrators begin the transformation to quality on their campuses. Dealing with the serious risk of alienating the faculty must be a centerpiece of campus efforts to undertake a transformation to quality. Alienation will occur if TQM is seen as another management fad from the evil empires of business, if administrators commit to quality primarily as a cost-cutting strategy, or if administrators fail to take seriously the need for a long-term, change-oriented commitment to TQM for themselves. The final section suggests promising ways to become a continuously improving campus, ways that will inspire the faculty's involvement.

GETTING STARTED IN USING TQM

It doesn't matter when you begin, so long as you start at once (W. Edwards Deming, cited in Tribus 1991, p. 48).

Two advantages of TQM are that you can learn about it *while* doing it, and you can learn about it *by* doing it. You need to (1) learn about it and (2) do it. One disadvantage of TQM is that *only* you and your colleagues can do it. Another disadvantage is that no recipe exists for the transformation to quality. It is a disadvantage from the standpoint that using TQM requires considerable time, effort, and judgment on your part, but that very flexibility is also a major component of the widespread successes organizations have had in using TQM.

The first part of this section is addressed to the individual reader. The second part deals with organizational commitment and action.

What Can You Do?

You need to act on your personal interest in TQM, whether or not your campus has made the commitment. If it has, your campus needs you to be well educated and might be unable to provide enough organized educational sessions as each person can use. If it has not, you can take some steps toward Total Quality anyway.[4]

Learning about TQM

This volume contains a bibliography on TQM. Many other works are available, and as you become attuned to the key concepts of TQM, you will notice that business magazines and other popular sources often report on users of TQM. We recommend that you begin with either Walton (1986) or Gitlow and Gitlow (1987). Walton's book is geared for the lay reader, while the Gitlows' book is for those who are a little more technically inclined. Then read Imai (1986). Anyone who wants to be very active in using TQM would benefit by owning Imai's book and using it as a reference manual. The "how-to" books (Berry 1991; Brassard 1989; GOAL/QPC 1988; Scholtes et al. 1991) are also excellent references, but Imai's book provides the context for using them. On leadership, read Block (1987), DePree (1989), Shook (1990), or Townsend (1990). Deming's book (1986) is essential to a full understanding of continuous improvement, but its style makes it most effective for those who have already established a basic understanding of the field. Others give ideas on applications to higher education (Cornesky et al. 1990, 1991; Marchese 1991; Miller 1991; Seymour 1992; Sherr and Teeter 1991; Spanbauer 1987; *Synthesis* 1991), but it is best to read some of the more general works first.

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[4] This subsection, "What Can You Do?" is adapted from North Dakota University System 1991.

A valuable approach would be to set up an informal book club with others who are learning about TQM—ideally, but not necessarily, people in your immediate work group. Read a chapter a week and spend an hour or so talking about what you have read. Does it apply to you? Do you need to translate it to make it useful in what you do? Do you agree with it? Do you see a way in which you could try to use it?

You could also check in your local business community to see whether anyone there is using TQM. You will be surprised at how many you find and their willingness to share. Visit them and ask them to tell you about what they are doing and how it is working for them. Invite them to join your book club. If they do business with your campus, ask them how your campus might improve its services to them.

Doing TQM

How you begin to do TQM will depend in part on your circumstances. Has your president made a clear commitment to TQM? If you are the president, are you prepared to make that commitment? Although some people have made an early public announcement of that commitment, in our opinion it is neither necessary nor, sometimes, wise. What is important is the depth and manifestation of the commitment, not its fanfare. Does your campus have a TQM coordinator or trainer with whom you can work? Having such a person is not necessary, but he or she is a potential resource if available. How well informed about TQM are the people you work with?

Let us begin with the person who is unsure of top-level commitment and whose campus is not yet well informed. Even "going solo," you can begin. Think about your work output (a lecture delivered, a form filled out, or whatever). The person who receives your output is your beneficiary. Develop a list of all your beneficiaries. Go to them and ask, "Are there some ways in which I could better meet your needs? Can I make your life simpler or more pleasant in some way?" You might or might not be in a position to respond as they request. If you can, respond as requested. If you lack the time, dollars, or authority to respond, explain it to them and ask whether you can meet their need in some other way that is within your power. Meanwhile, remember what they asked for and look for opportunities to gain the time, dollars, or assistance you need.

You can also examine the work processes in which you participate. Are you, or is someone close to you, engaging in work that might have been functional at one time but now seems useless? For example, one university system office staff member realized that he had long been assuming that some purpose must exist behind a stack of computer printouts that the campuses submitted every year. He had never figured out its purpose, so he asked around to see whether anyone used the information. He found that the printouts had been replaced by a consolidated report generated centrally, and he notified the campuses that they could stop producing and shipping the printouts. Could you or your colleagues stop doing some things or do them more productively in some other way?

Finally, and by all means, look for others who share your interest in TQM and build a support network.

If you have more organizational support, you can do more. Teamwork is essential in using TQM, and other interested, informed people are potential team members. Brainstorm together on the major problems you face in your work. Examine the resulting list and see whether some of them would yield to immediate and obvious corrective action. If so, take that action. But beware: Some problems are more complex than they look, and some solutions end up creating new problems. Be sure the change you are considering does not fall into these categories.

Pick one of the problems that is not so easy and make a commitment to work on it through the PDCA cycle. Your team might choose one because you think you can solve it in a relatively short time, thus giving yourselves some early positive results. Or you might choose one that is pretty much confined to your department, so you will not have to persuade someone from another department to join your team until later, when TQM is more widespread on the campus. Another good reason for selecting a problem is that it is really bugging you and solving it would make your work life much better. You will probably *not* want to select a problem that is enormous in scope and widespread throughout the campus. Save it for later, after the president's commitment to TQM is clear and you have developed your skills and confidence.

After selecting a problem, put together a small team, probably no more than seven to ten members, consisting of people whose work relates to the problem and who collectively represent the primary participants in the problem process. It is beneficial, but not essential, to involve a campus TQM coordinator or group dynamics expert as the team's facilitator. If you do not have access to such a person, take out a book (for example, Berry 1991; Brassard 1989; Gitlow and Gitlow 1987; GOAL/QPC 1988; Imai 1986; Scherkenbach 1988; Scholtes et al. 1991; Walton 1986) and use it as a guide to the process of improvement. Use the Plan-Do-Check-Act cycle to be sure you spend enough time defining and analyzing the nature of the problem. Be sure to track the process in a flow chart and collect data on it.

Take the team through the Plan-Do-Check-Act cycle, one step at a time. Teams normally meet for an hour a week, often using some time between meetings to collect data. Be sure you have a clear sense of purpose, so that you will recognize when the team has done its work and can be disbanded.

If you select your first project carefully and follow the PDCA cycle, it should be successful. Nevertheless, you should be aware that you will experience some frustration. Any statistician will tell you that the best time to run an experiment is after you have performed the experiment. Part of the PDCA cycle is always learning from experience, which applies to improvement projects themselves. Teams almost always believe that they were successful but that they could have done the project better. They can make those feelings productive by ensuring that they learn from experience so that each successive project proceeds better than its predecessors.

Another kind of activity involving TQM you and your colleagues can undertake is to systematically define who your beneficiaries are and find out what they need. Sometimes, beneficiaries are able to tell you exactly what they need from you. It is vitally important to ask them, through interviews or perhaps surveys or focus groups. Many times they cannot put their needs into words. Often you can learn what your beneficiaries need by watching them or deliberately trying to put yourself in their place. Certainly you can learn their needs by paying close attention to any complaints they might register.

When you identify something your beneficiaries need from you that involves changing your work, you are back in the cycle of systematic improvement. Is it something you can remedy easily—say, the way you answer the telephone? Or does it require a project team?

In the end, whether in learning about TQM or doing it, it matters far less *how* you start than *whether* and *when* you start. If you are enthusiastic about TQM, it is not enough to think of yourself only as a beneficiary who is eagerly awaiting someone else's use of it. Faculty cannot ethically demand TQM from administrators without getting into it themselves. Administrators cannot possibly demand TQM from their staff without their own personal involvement. Each person who pursues quality must become a role model for others. "The transformation is everybody's job" (Deming 1986, p. 24).

Becoming a Continuously Improving Institution

Just as the philosophy and tools require customizing to the organization, no "proper" way exists of becoming a continuously improving organization. The literature contains a few important principles as well as some common pitfalls to avoid (Holpp 1989), but the campus is left with wide latitude for determining the most suitable process of transformation.

Before we review the principles, the time has come to change our language. To remind you one last time, TQM is a comprehensive way of living and working in organizations—a way that is rooted in a commitment to continuous improvement in meeting beneficiaries' needs. It is not a program, a tool, or a set of tools. People in organizations oriented toward quality cease to think of themselves as adopters of TQM. They simply live and work in certain ways, according to certain values, doing things in these ways instead of those. Therefore, we are uncomfortable with recommending that an organization "adopt TQM" or "become a TQM organization." So we henceforth refer to "quality-improving organizations" and how yours might come to live and work on the premise of continuously improving quality and delighting beneficiaries.

It is essential that top administrators, especially the president and possibly including the governing board, make a commitment to improving quality for themselves and the campus. They must do so with a full understanding of what that commitment means, and they must always be at the forefront of organizational learning about how to improve quality. They must also change their own individual and group behavior in dramatic as well as subtle ways.

Another way to put it is that leaders must be trustworthy. Everyone else in the organization must be able to trust their leaders' statements of commitment to improving quality. If they act contrary to quality in the early stages, leaders must change that behavior as soon as they become aware of it, and they might need to explain what they have just learned to those who witnessed their contrary actions. Nothing will undermine a commitment to improve quality faster than mistrust.

"The twin pillars of [the leadership category of the Malcolm Baldrige National Quality Award] are symbolism and involvement" (Garvin 1991, p. 88). Many symbolic moves serve practical purposes as well, such as allocating resources to the transformation to quality, developing a quality mission and policy, redesigning the way the president spends time, and changing the agendas of key groups.

Sometimes people become confused about whether quality improvement is a "top-down" or a "bottom-up" process. If this transformation is supposed to involve everyone, why insist on top-level commitment early in the process? Does not doing so undermine the whole idea? The answer is emphatically "no." Everyone acknowledges that the leadership team has long-term, strategic organizational responsibility; they depend on the leaders for it. As the orientation toward quality matures, the leaders will delegate considerably more authority for operational and tactical matters than before. But it is fundamentally unfair—as well as completely ineffective—for the leaders to delegate responsibility for making the organizational commitment or the personal changes that improving quality requires.

The advice from successful efforts at transformation is to: (1) pursue quality improvement because it is a sound strategy, not because it is the latest fad; (2) manage quality as the organization's other most important tasks are managed and do not assume that quality will manage itself; (3) establish specific management direction and goals for results, then monitor and celebrate progress; (4) use the existing organizational structure and involve everyone; and (5) use a systematic organizational transformation process with a self-designed plan (Harwood and Pieters 1990).

Following these suggestions inevitably requires a major, continuing investment in education for all personnel. People cannot improve quality unless they learn new knowledge, skills, and attitudes. External resource people can teach and consult early in the transformation process, and they can sustain motivation and provide new insights as time goes by. Internal expertise is needed to lead the ongoing education program for everyone on campus.

The campus needs an infrastructure that will support increasing levels of integration, coordination, communication, and conflict management. It also needs an infrastructure for the transformation process itself. Who will develop a quality mission, a quality education program, and a plan for organizational change? How will it be staffed? What are the information and data needed? What questions will the faculty and staff have, and how will they be answered? How will the campus develop a strategic quality plan as the glue that holds the effort together? (Garvin 1991, p. 91). We believe that a *new* infrastructure is not only unnecessary but also unwise. The existing infrastructures of administration and governance need to change, in much the same ways that efforts to ensure fairness with respect to gender, race, ethnicity, and disability needed to change. While it might be sensible to designate one or more individuals as having specific responsibilities regarding the transformation, especially in its early stages, the improvement of quality is everyone's responsibility.

Some campus cultures are likely to be more hospitable than others to the improvement in quality because they already exhibit many of its values and behaviors. One way to think about it is by reference to the "five deadly diseases" (Deming 1986, chap. 3): short-term thinking, management turnover, inconsistency in acting on a commitment to improving quality, fostering competition rather than cooperation among people, and overreliance on measurable figures to the exclusion of important qualitative aspects. The extent to which a campus exhibits these diseases is one indication of the magnitude of cultural change required.

Some campus cultures are likely to be more hospitable than others to the improvement in quality because they already exhibit many of its values and behaviors.

When they understand how closely the existing campus culture matches the requirements of improving quality, decision makers can gauge the feasibility of making the commitment, the rate at which they can proceed, and departments in which to start. Tools to help assess the climate are available (Linkow 1989). Changes in culture will be necessary, and they "must be introduced in stages so that the organization can improve based on what it learns from itself" (Stratton 1990, p. 14).

No process can be defined as exempt from quality, although some processes will come first, others later, and some much later. The interdependence of processes and departments requires total involvement as the ultimate aim. Interviews with broadly experienced consultants on quality reveal that often the most important factor in successful transformation is that the effort is organizationwide rather than piecemeal (Stratton 1990, p. 16). One important implication of this knowledge is the need for a way of helping people, especially upper- and middle-level administrators, to become knowledgeable, comfortable, and committed. Some will take to it right away. Others will need time and encouragement.

As all of these principles imply, becoming a quality-improving organization takes time. It requires realistic expectations, long-term commitment, learning from mistakes, road maps, and celebrations of progress.

The transformation also takes resources. Ironically, however, most organizations making a commitment to quality seem to have done so in exceptionally stressful financial circumstances. Organizations with flush resources believe that they have no need to change, and quality requires incredible change for most organizations.

Education of personnel requires resources. How expensive it turns out to be depends on whether you decide to use internal or external instructors and well-known or less well-known consultants. We would like to believe that higher education, a learning enterprise, could minimize the dollar cost of this important expense under the right circumstances. The other cost is people's time. This cost is really an investment that yields productive time in the future if people are learning to cut the amount of time they spend responding to crises by eliminating the root causes of such crises. The investment in time is certainly large, especially at the outset before its benefits begin to materialize, and making such time in our busy institutions is not easy.

Making time is an important demonstration of committed leadership. On August 11, 1990, the senior staff of the U.S. Military Airlift Command (MAC) was scheduled for a three-day seminar on improving quality, another in a series that had begun some time earlier. On August 2, Iraq invaded Kuwait; by August 7, the United States had begun Operation Desert Shield, and MAC was in charge of moving U.S. materiel and troops to Saudi Arabia. The MAC commander in chief, General Hansford T. Johnson, did not cancel the seminar. In fact, he personally attended the entire program. His actions not only underscored his commitment, but also signaled his trust in his deputies to handle matters while he was gone. MAC personnel credit their initiatives to improve quality as having contributed significantly to MAC's spectacularly successful services during the military crisis (Stratton 1992). If Johnson and his staff could make the time, so can we.

A common piece of advice for the improvement of quality is to set outrageous targets—not 10 percent better, but 500 percent better at no additional expense. The result of such targets tends to be change of such magnitude that it breaks people's preconceptions about how to do things. Similarly, when people can no longer hope for better days, when their organization appears on the verge of bankruptcy or other externally imposed undesirable changes, and when they then learn about continuous improvement in quality, they simply find resources to support it.

You will find many forms of assistance for your transformation. Some of them are very expensive. You do not need them. And you cannot avoid the hard work, the rolling-up-of-sleeves and sweating, the agony of change, by giving money to fancy, high-priced consultants.

Someone on campus should join the American Society for Quality Control.[5] If a state or local quality council is located near you—and their number is growing rapidly—campus leaders should also be involved in it. Look for quality-improving businesses in your neighborhood or through your alumni and board members, and develop collaborative relationships with them to learn from and with each other.

Set up a committee to review books and videotapes about quality to order for your campus library. Develop a program of learning opportunities. Network with other campuses that have made a commitment to quality; that number, too, is growing rapidly. The ASQC, the American Association for Higher Education, and the Association for Institutional Research are promising forums for identifying colleagues oriented toward quality.

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[5] ASQC, P.O. Box 3066, Milwaukee, WI 53201-3066; phone 800-248-1946. The membership fee for 1992-93 is $58.

Finally, when you are sitting in your office alone at the end of the day, wondering why you ever got into this quality business and not sure what in the world to do next, you can do one thing that will answer both questions:

> Listen to the people you serve.

They are why you care about quality, and they will tell you what to do.

APPENDIX A: Criteria for the 1992 Malcolm Baldrige National Quality Award

The U.S. Department of Commerce has provided a set of criteria that can also act effectively as a checklist for those wishing to assess their organization's use of TQM. Many organizations have begun to use the criteria regularly, often annually, to help them see their progress. The criteria are associated with the department's Malcolm Baldrige National Quality Award, authorized by Congress and privately funded to recognize the nation's leading practitioners of TQM since 1989.

Notice that in each of the categories, the descriptive paragraphs raise key questions; they do not give definitive guidance about *how* the organization should answer the questions. This approach to assessing your use of TQM emphasizes again the fact that organizations need not use any particular tool of TQM or follow the dictates of any special author or consultant. Each organization must find its own most effective ways of answering these questions, with TQM providing suggestions that have been found to work well at various times in diverse organizations.

The following list is slightly modified to suit educational institutions. The point values indicate the relative importance of each section, with a total of 1,000 possible points.

1.0 Leadership 90 points

What are the top administrators' leadership, personal involvement, and visibility in developing and maintaining a focus on beneficiaries and an environment for excellent quality? What are our quality values, how are they projected in a consistent manner, and how do we assess and reinforce adoption of the values throughout the organization? How are the focus on beneficiaries and quality values integrated into day-to-day leadership, management, and supervision of all departments? How do we include our responsibilities to the public for health, safety, environmental protection, and ethical practices in our policies and activities to improve quality?

2.0 Information and Analysis 80 points

What is our base of data and information used for planning, management, and evaluation of quality, and how do we ensure reliability and timeliness of and access to data and information? How do we select data and information for competitive comparisons and world-class benchmarks to support planning, evaluation, and improvement of quality and performance? How do we analyze data and information to support our key operational and planning objectives?

3.0 Strategic Quality Planning 60 points

What is our strategic quality planning process for short-term (one to two years) and longer-term (three years or more) quality leadership and satisfaction of beneficiaries? What are our principal priorities for quality and plans for the short term (one to two years) and longer term (three years or more)?

4.0 Human Resource Development And Management 150 points

How do our plans and practices for the development and management of human resources support our plans for quality and organizational performance? What means are available for all our personnel to contribute effectively to meeting our objectives for quality? What are the trends in personnel involvement? How do we decide what education and training in quality our personnel need, and how do we use the knowledge and skills they acquire? What types of education and training in quality does each category of personnel receive? How do our performance, recognition, promotion, compensation, reward, and feedback support improvement in quality? How do we maintain a work environment conducive to the well-being and growth of all personnel? What are the trends in well-being and morale of our personnel?

5.0 Management of Process Quality 140 points

How do we design and introduce new or improved programs and services to meet or exceed beneficiaries' requirements? How do we design processes to deliver according to the requirements? How do we manage the processes that produce our programs and services (including business processes and support services) so that current requirements for quality are met and quality and performance are continuously improved? How do we ensure, assess, and improve the quality of materials, components, and services furnished by our suppliers? How do we assess the quality and performance of our systems, processes, and practices and the quality of our products and services?

6.0 Quality and Operational Results 180 points

What are our trends in quality and current levels of quality for features of key programs and services? How do our current levels of quality compare with national averages and national leaders in comparable organizations? What are our trends in overall performance of operational, process, and support services, and how do they compare with competitors and appropriate benchmarks? What are our trends and current levels in quality of supplies and services furnished by other providers?

7.0 Beneficiaries' Satisfaction 300 points

Who are our beneficiaries? How do we determine their current and future requirements and expectations? How do we provide effective management of our relationships with beneficiaries? How do we use information gained from beneficiaries to improve management's strategies and practices? What explicit and implicit commitments do we make to our beneficiaries? How do we determine beneficiaries' satisfaction, both in itself and relative to competitors, and how do we improve our methods for determining satisfaction? What are our trends in beneficiaries' satisfaction and key indicators of dissatisfaction? How do they compare with those of competitors? How do we determine our beneficiaries' future requirements and expectations?

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